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Korean EFL Learners' Use of Sentence Stress: Focusing on L2 Comprehensibility and Acoustic Correlates in Production

한국인 영어 학습자의 문장 강세 사용 연구: 제2언어 이해도와 발화상의 상관 음향 신호를 중심으로

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Korean EFL Learners' Use of Sentence Stress: Focusing on L2 Comprehensibility and Acoustic Correlates in Production

by

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ABSTRACT

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It has been widely accepted that English sentence stress directly affects speech comprehension. The present study explored the contribution of English sentence stress to perceived comprehensibility of L2 speech, and revealed Korean learners' use of English sentence stress.

For this purpose, two experiments were conducted. First, speech samples of 39 Korean speakers reading an English dialogue were recorded. Each learner's speech characteristics were examined to determine how they contributed to the L2 speech comprehensibility and foreign-accentedness perceived by native listeners. The speech characteristics consisted of sentence stress appropriacy, sentence prominence frequency, pitch range, the number of pauses, the total duration of pauses, the mean length of run, and the articulation rate. The relative contribution of each characteristic was examined by stepwise multiple regression with each

pronunciation score as a dependent variable, and each suprasegmental measure as an independent variable.

Comprehensibility was best predicted by the combination of the number of pauses, sentence stress appropriacy, and articulation rate. In addition, the strength of the relationship between each of the three variables and the comprehensibility score was more or less the same. In contrast, foreign-accentedness was mainly determined by sentence prominence frequency and speech rate factors. The results of the first experiment support the claim that sentence stress appropriacy is a significant factor for speech comprehension in the L2 context. Further, this study revealed that the importance of sentence stress is not negligible compared with other previously attested factors such as speech rate and pause use.

In the second experiment, based on the importance of English sentence stress in L2 speech comprehensibility, the overall characteristics of Korean learners' use of English sentence stress were examined. The investigation was conducted both syntagmatically and paradigmatically in terms of acoustic cues (vowel duration, f0, and intensity) used for 13 accented words. In syntagmatic observation, comparisons were made between two focus types (broad vs. narrow) and two word types (content vs. function). A total of 39 participants were divided into three groups based on their length of residence in an English speaking country:

Long Residence Group (8 ~ 19 years), Experienced Group (one and a half months ~ two years), and Inexperienced Groups.

The results showed that the Long Residence Group did not differ from a native speaker in their production of sentence stress. However, the Korean learners who learned English most of the time in an EFL context showed the following characteristics.

First, narrow focus was more easily learned than broad focus by Korean learners of English. The accentuation in broad focus is especially problematic for Korean learners when it occurs on function words. It seemed that the Experienced Group's knowledge of function word reduction according to English rhythm hindered them from accenting words when they did need to be accented at the discourse-level. As for the Inexperienced Group, they showed a more consistent pattern regarding the accentuation in broad focus. The acoustic changes indicated that they failed to apply the sentence stress rule to the last lexical item in broad focus, and this failure was observed for both content and function words. This implies that knowledge of sentence stress placement is not easily obtainable without ample exposure to English.

Second, Korean learners (especially the Experienced Group) marked the accented words by varying f0 cues with ease. In some cases, they delayed the declination in the transition from pre-accent to accent, while lowering the pitch

more substantially from accent to post-accent than the other two groups and the native speaker. It seemed that the Experienced Group compensated for the lack of durational change by varying vowel pitch more. This partly shows that the participants in this group have some knowledge about accentuation but have a problem with the phonetic realization of it.

The findings of this study support the importance of English sentence stress in communicative context. In a Communicative Language Teaching approach, more consideration of English sentence stress is needed in the instruction of English pronunciation. In addition, in teaching English sentence stress to Korean speakers, it should be considered important that Korean learners be taught not to reduce function words and not to rely on the f0 cues too heavily when accentuation is needed in the given context. Furthermore, given that English sentence stress operates at the discourse level and is inherently related to the use of anaphoric and referential expressions in English, sentence stress should be instructed along with the discourse level grammar in an integrated way.

Keywords: English sentence stress, L2 English pronunciation, Comprehensibility, Foreign-Accentedness

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LIST OF ABBREVIATIONS

AOA	Age of Arrival
CLT	Communicative Language Teaching
EFL	English as a Foreign Language
EIL	English as an International Language
ESL	English as a Second Language
f0	Fundamental Frequency
L1	Native Language
L2	Second Language
LOR	Length of Residence
MLR	Mean Length of Run

CHAPTER 1 INTRODUCTION

One of the ultimate goals of learning a foreign language is to be able to communicate effectively through the medium of the target language. The present research aimed to find ways to improve the speech comprehensibility of Korean learners of English in the communicative context. This chapter begins by describing the aim of the study in section 1.1. In section 1.2, the problem statement and the potential significance of the present study are presented. Section 1.3 presents the research questions, and section 1.4 describes the organization of this dissertation.

1.1 Aims of the Study

This study focuses on the use of English sentence stress by Korean learners of English. Specifically, the study reveals the contribution of sentence stress appropriacy to learner language comprehensibility,[1] and investigates Korean learners' sentence stress production in terms of focus and word type. The ultimate aim is to provide insight to the development of discourse-level pronunciation

[1] In the L2 pronunciation research, comprehensibility refers to "a listeners' perception of the degree of difficulty in understanding an utterance" which is differentiated from comprehension (Munro, Derwing, & Holtby, 2010, p. 233).

teaching materials that may effectively and efficiently improve L2 English with limited input.

1.2 Rationale for the Study

In a communicative approach to L2 English teaching, spoken language is naturally a main focus in curricula. A number of approaches and methodologies have been proposed by researchers and teaching practitioners to teach learners the features of spoken English to assist their processing of both spoken input and output (Field, 2009). Field (2009) categorizes important L1 English decoding processes into five levels of phoneme, syllable, word, syntax, and intonation. Table 1.1 shows the pronunciation-related levels and their processes (Field, 2009, p. 115).

Table 1.1 *Examples of Important L1 Decoding Processes*

Level	Processes
Phoneme	Identifying consonants and vowels / Adjusting to speakers' voices
Syllable	Recognising syllable structure Matching weak syllables and function words
Intonation	Making use of sentence stress / Recognising chunks of language Using intonation to support syntax Reviewing decoding at intonation group level

As stated concerning the intonation level, sentence stress is an important factor in decoding the message, alongside the perception of speech chunks. The focuses of language classrooms or textbooks, however, are mainly on how a specific phrase may be modified by the means of vowel/consonant reduction or linking and intonation contours for sentence types such as statements or questions (Park & Son, 2012; 2013), leaving the use of sentence stress uncovered in classrooms. It seems that many current practices of L2 English pronunciation teaching suggest that learners need to become accustomed to such reduced and linked articulation when listening, and also to be able to use such forms when speaking.

Unfortunately, this is easier said than done for the foreign language learners of English, many of whom find it difficult to produce speech that sounds like natural spoken English. Korean learners may find the rhythm of English based on stressed words particularly difficult to master, possibly due to limited input for listening and opportunities for production practice in their EFL context. However, in the EFL context, the effectiveness and efficiency in achieving the communicative aims of English learning ought to be prioritized. Learners may well wish to be taught how to convey their intended meaning, and how to modify their speech to do so effectively, rather than being taught how particular sounds may be reduced and modified in certain phonological environments to sound

native-like. Therefore, listeners' perception and comprehension should always be taken into consideration when addressing issues regarding L2 prosody in the educational context, where teaching practitioners can be aided with the findings of such research.

A substantial amount of research has focused on L2 learners' speech production and native listeners' perception. The main concern of such research is the relationship between foreign-accentedness and comprehensibility, emphasizing that the ultimate goal of EFL/ESL pronunciation instruction should be to make the learner language optimally comprehensible (e.g., Munro & Derwing 1995a; 1995b; 1999; Derwing & Munro, 1997). However, the focus of such research in terms of L2 phonetics and phonology has been on actual acoustic characteristics, such as speech rate, pause frequency, and reduced forms, etc. The findings usually indicate that increased speech rate positively contributes to the comprehensibility of L2 speech and the use of pauses negatively correlates with it (e.g., Kang, 2010; Isaacs & Trofimovich, 2012). However, such findings leave much to be desired in the teaching context. It would be unhelpful to tell students that they should speak English with a *moderate* rate and without pauses in order to improve their L2 English comprehensibility. Instead, the learners need to be taught how to make their speech rate more optimal and to avoid using frequent pauses, not just the characteristics of comprehensible speech.

The present study aimed to test the contribution of English sentence stress appropriacy to comprehensibility. Sentence stress is an abstract term referring to an entity that is "relatively more prominent within a metrical structure" (Ladd, 1996, p. 231).[2] It is generally accepted that the features of English sentence stress directly affect speech comprehension (Cutler, 1976, among others). For example, misplaced sentence stress causes the listener confusion about the speaker's intended meaning, resulting in communication breakdown (Jenkins, 2002). However, learning English sentence stress is not a simple matter for Korean learners of EFL. The reasons are the following. First, the prosodic realization mechanisms of English and Korean differ. Second, the correct use of sentence stress requires interrelated knowledge of phonetics, phonology, syntax, semantics, and discourse structure (Baker, 2010).

L2 learners need to learn how to effectively express what they intend to convey and how to reduce the processing load for listeners. This study attempted to reveal the contribution of the appropriate use of English sentence stress to the comprehensibility of L2 learners' speech, and to uncover the problems they may have in the production of sentence stress. In addition, it is believed that the proper use of sentence stress would alleviate the problems Korean learners have with English rhythm, as sentence stress is fundamental to rhythm.

[2] Sentence stress is defined in more detail in section 2.1.2.

Sentence stress has not been dealt with comprehensively in L2 speech comprehensibility research. This may be largely due to methodological problems as the production and perception of sentence stress seems to be in the realm of subjectivity. It is the speaker who determines the appropriate place of sentence stress in spontaneous speech, and further, sentence prominence is a perceptual notion that should be determined by listeners. Few studies have directly investigated the effect of sentence stress appropriacy on L2 speech comprehensibility, while accounting for other critical factors such as pauses and speech rate. Therefore, research findings thus far are insufficient to determine the importance of sentence stress in L2 English.

The experiments reported in this dissertation investigated first, whether the appropriate use of sentence stress in L2 English speech could significantly predict the speech comprehensibility along with other attested speech variables. Second, the problems Korean EFL learners experience were investigated in the use of acoustic cues during production of English sentence stress.

1.3 Research Questions

The present study aimed to investigate the contribution of the appropriate use of sentence stress to L2 English speech comprehensibility, and to determine what

aspects of the production of English sentence stress are difficult for Korean EFL learners. As mentioned above, there has been some research on the importance of English sentence stress, but little has compared this to the role of other important factors such as speech rate and pauses. Furthermore, little research has focused on the general patterns of Korean EFL learners' use of English sentence stress. Most previous research was limited to the production of content words given in answer to *wh*-questions (e.g., Choi & Jang, 2007; Um et al., 2001, among others), and included a relatively small number of participants (e.g., three Korean speakers in Choi & Jang, 2007; six Korean speakers in Kim, 2007, among others). In light of these research needs, the specific questions addressed in the present study are as follows:

1. How and to what extent does the sentence stress of Korean EFL learners' affect their L2 speech comprehensibility and foreign-accentedness?
2. How is sentence stress realized acoustically in Korean learners' speech?

These two research questions are not as independent of each other as they may first appear. Answers to the first research question will indicate the importance of sentence stress appropriacy in L2 English pronunciation. In the Communicative Language Teaching (CLT) approach, accurate articulation of L2

English pronunciation is considered less important than the use of appropriate vocabulary and grammatical structures; intelligible pronunciation is more favorably considered in L2 classrooms (Celce-Murcia et al., 1996). This context of the teaching paradigm makes it crucial for pronunciation research to begin by revealing the significant importance of the targeted pronunciation feature for effective communication.

Furthermore, to effectively include English sentence stress in an L2 pronunciation curriculum, it is essential to examine the overall characteristics of Korean learners' sentence stress production. These two research questions have the same purpose, which is to encourage learners to use appropriate sentence stress and thereby improve their communicative efficacy.

1.4 Organization of the Dissertation

This dissertation consists of five chapters. Chapter 1 introduced the purpose of the study and presented the research questions. Chapter 2 introduces the theoretical background of this study. Chapter 3 reports the experiment related to the first research question regarding the contribution of sentence stress appropriacy to the comprehensibility and foreign-accentedness of Korean EFL learners as perceived by native English speaking listeners. Chapter 4 investigates the use of acoustic

cues in the production of sentence stress by Korean learners in terms of focus types (broad vs. narrow) and word types (content vs. function). Chapter 5 offers conclusions based on the two experiments, and suggests directions for future research in this field.

CHAPTER 2 THEORETICAL BACKGROUND

This chapter presents the theoretical background for the present study. Section 2.1 gives an overview of focus marking in English and Korean, describing their focus marking systems and information structure. Section 2.2 presents the findings of research on L2 English pronunciation and comprehensibility, focusing on the role of suprasegmental features. Finally, section 2.3 discusses in detail the findings of research on sentence stress, and speech comprehensibility and production in L2 English.

2.1 Focus Marking in English and Korean Prosody

The role of prosody in English information structure, particularly sentence stress appropriacy, is the focus of this study. English sentence stress consistently interacts with the information structure of an utterance. The term information structure appeared first in Halliday (1967) and is defined as the "formal expression of the pragmatic structuring of a proposition in a discourse" (Lambrecht, 1994, p.5). According to Lambrecht (1994), the notions covered by information structure are (1) presupposition and assertion, (2) identifiability and activation, and (3) topic and focus.

In section 2.1.1, the pragmatic functions of English intonation are summarized. In the following section 2.1.2, the system of English sentence stress is described. Section 2.1.3 compares the ways in which prosody indicates "givenness" (vs. "newness") in English and Korean. Section 2.1.4 presents research findings on the effect of sentence stress on speech comprehension. Finally, section 2.1.5 presents the findings of research on the acoustic cues used to mark prominence/focus in English and Korean.

2.1.1 Pragmatic Functions of English Intonation

The primary focus of this study is English intonation in the L2 context. More specifically, among the several components of English intonation, the use of sentence stress is the primary concern of this thesis. Defining intonation is not a simple matter, and I follow Ladd's (1996, p. 6) definition:

Intonation refers to the use of suprasegmental phonetic features to convey 'postlexical' or sentence-level pragmatic meaning in a linguistically structured way.

According to Ladd (1996), in the above definition, suprasegmental features include only fundamental frequency (f0), intensity, and duration. The term sentence-level indicates the exclusion of word-level stress, but the inclusion of suprasegmentals that make a meaningful contribution to an utterance or phrase-level category, such as focus marking.

The functions of intonation vary across languages. Intonation also has unique functions in a language across grammatical levels. Indeed, intonation is involved at the syntactic, semantic, and discourse levels of language (Hirschberg, 2004).[3] At the discourse level, intonation can determine the meaning of an utterance and can be used as a cohesive device in organizing a text. In the CLT approach to L2 teaching, intonation has been emphasized for its role in sentence meaning and in the comprehension of utterances (Celce-Murcia et al., 1996). English sentence stress, which is the primary focus of this study, has importance for discourse interpretation.

Hirschberg (2004) presented four ways in which discourse and intonation are related. First, the interpretation of pronouns is regulated by accentuation. Normally, a pronoun is deaccented in its most highly accessible or recoverable state, and a new context-dependent meaning is acquired by the pronoun when it is

[3] The realization of focus for a specific *wh*-question (so-called narrow focus), and the interpretation of a particular adverb such as *only*, are considered an interface between prosody and semantics. Syntactic operations of intonation include resolving structural ambiguities (Hirschberg, 2004).

accented. Second, discourse intonation reflects the information status of a previously mentioned entity. This observation traces back to Halliday (1967), who examined sequences of words forming 'information units,' not necessarily corresponding to grammatical constituents. The information unit requires a single piece of information to be focused (hence accented), which is usually new information. This distribution of information determines the placement of sentence stress. Third, the introduction and end of a topic is marked by intonation. According to Brown and Yule (1983), a speaker introduces a new topic with a very high-pitched paratone, and s/he produces the same word with a low pitch when closing it off. Finally, the most often investigated aspect of discourse-related intonation patterns is the expression of speech acts. A combination of a set of tones such as nuclear pitch accent (H*, L*, L+H*, L*+H, and H+!H*), phrase accent (L-/H-), and boundary tone (H%, L%), for example, are used to distinguish between a statement (H* L-L%) and a question (L* H-H%) (Hirschberg, 2004).[4] In a similar vein, Halliday and Hassan (1976) described the cohesive function of

[4] This description of English intonation in Hirschberg (2004) follows the ToBI system (Silverman et al., 1992) based on the description of Pierrehumbert (1980). This system describes the characteristics of English intonation through the combination of four possible tones and pitch accent. Specifically, an intonational phrase consists of a pre-nuclear pitch accent, a nuclear pitch accent, phrase accents, and a boundary tone, where pre-nuclear accent is optional.

intonation, by which, for example, a fall-rise[5] intonation pattern expresses doubt or objection.

In the CLT approach to L2 pronunciation teaching, intonation is perceived as more important than the segments. However, it seems that it is not adequately dealt with in L2 classrooms, despite its paramount importance in effective communication. Park & Son (2012; 2013) surveyed the awareness of English intonation for communication purposes among students and teachers in Korean secondary schools, and they considered it important, but they were not taught English intonation as much as it is needed. They also revealed that the textbooks do not contain sufficient contents needed for teaching intonation. In addition, among the pronunciation features covered in eight textbooks, "linking" most frequently appeared, followed by "word stress" and "intonation contour." In addition, it seemed that the contents on English intonation consisted mostly of the fall-rise patterns of questions and statements.

2.1.2 English Sentence Stress

[5] In Pierrehumbert's (1980) description, the fall-rise tone in the British school is H* L-H% (Ladd, 1996, p. 82).

Sentence stress or accent in English refers to "the emphasis that makes one syllable more prominent than other syllables, and therefore makes one word more prominent than the other words in a tone unit" (Kreidler, 2004, p. 141). Sentence stress can be placed on any part of a given English utterance, and interacts consistently with the overall intonation pattern. Wells (2006) mentions that "(t)he most important decision the speaker makes in selecting an intonation pattern is to decide where the nucleus goes: which is the last word to be accented (p. 93)," emphasizing the importance of sentence stress and its contribution to intonation patterns.

Sentence stress was first known as "Normal Stress" by Newman, which is assigned by a rule within a sentence (1946; cited in Ladd, 1996). This was substituted by "Nuclear Stress," coined by Chomsky and Halle (1968). Normal stress refers to the default stress at the sentence level, excluding contrastive stress. This sentence-level prominence has been called by several names by different linguists: "sentence stress" by Bresnan (1971), and Schmerling (2013), "tonic(ity)" by scholars of the British school such as Halliday (1967),[6] Wells (2006), and Brazil (1997), and "(pitch) accent" by Bolinger (1958; 1972). In the present study,

[6] Halliday (1967) postulates that an utterance is divided into several tone units (tonality): a sentence may be pronounced with a single tone unit as well as with a couple of tone units. Each tone unit has one accent (sentence stress), and the placement of this accent is called tonicity.

the term "sentence stress" will be maintained throughout, referring to both default stress and contrastive stress.

In order to understand the placement of sentence stress in English, the term *focus* should first be defined (Ladd, 1996). Focus is defined as any word or phrase in an English utterance that shows informativeness, and that listeners' attention is brought to (Halliday & Greaves, 2008). There are two types of focus: narrow focus and broad focus (Ladd, 1996). If focus is projected onto a single word, it is said that the word has narrow focus. For example, narrow focus is easily identifiable in answers to *wh*-questions, such as (1) below, in which the accented word is italicized.

(1) What did you buy for her birthday gift?

I bought her a *scarf*.

In the answer sentence in (1), the word *scarf* has narrow focus; this focused word introduces new information. Narrow focus can also be observed at the discourse level in an utterance, as in (2) below.

(2) I didn't give him three francs, I gave him *five* francs. (Ladd, 1996, p. 162)

In the sentence above, the word *five* has narrow focus, and, in this case, it has a contrastive meaning. Contrastive focus is inherently narrow focus, although double contrastive focus is also found (Wells, 2006). When an utterance has narrow focus, it is quite straightforward to accentuate it correctly. Speakers are known to place the accent directly on the focused element.

However, things are more complicated when it comes to broad focus. If focus is projected onto a larger unit than a single word (i.e., if there are two or more new information words), it is said that the unit has broad focus (Ladd, 1996). According to Ladd (1979), "narrow and broad focus do not form a dichotomy like normal/contrastive, but are simply different points on a spectrum; focus applied to smaller or larger constituents" (p. 129). Broad focus is best exemplified in answers to open questions, such as (3) below.

(3) What did you do for her birthday?

I *bought a scarf*.

Here, *bought a scarf* is new information, and is thus focused as a whole. The accentuation of narrow and broad focus has not been explained in a unified manner. Narrow focus has a straightforward application of accentuation. As shown in the above examples of narrow focus in (1) and (2), the focused word is accented,

which means it is the most prominent word in the sentence or tone unit. In accounting for broad focus, by contrast, language-specific rules should be taken into consideration. When a phrase or a sentence as a whole is focused (as more than one word can be new information), the accent falls on the last lexical item (Ladd, 1996). Therefore, the phrase *bought a scarf* with broad focus has the sentence stress on *scarf* by the application of the rule. The following exemplary sentences in (4) further refine the difference between the two accentuation patterns (the accented syllable is capitalized) (Kreidler, 2004, pp. 146-147).

(4) a. / Mary told John all the SEcrets. /

b. / Mary told John ALL the secrets. /[Not just a few secrets]

c. / Mary told JOHN all the secrets. /[She didn't tell Harold or Richard or …]

d. / Mary TOLD John all the secrets. /[She didn't hint, imply, or write them …]

e. / MAry told John all the secrets. /[It wasn't Angela or Beatrice or …]

When the whole utterance is new information (either a phrase or a sentence), the sentence stress falls on the last lexical item, as in (4a). In this case, the word *secrets* bears sentence stress but does not have any more informative value than the other words. The sentence stress is determined by the structural rule. However, in (4b ~ e), the stressed words have more special emphasis than other non-

prominent words. Each of the words has contrastive focus, which is also narrow focus (Kreidler, 2004).

A sentence or a phrase is also said to have a default or unmarked accent when the final word of the sentence has sentence stress. If sentence stress falls on any part of the sentence other than the final position, it is considered marked (Kreidler, 2004).

This notion of the sentence stress rule was first suggested by Chomsky and Halle's (1968) Nuclear Stress rule (NSR), citing Newman (1946), where nuclear stress is placed on the rightmost word-level stress in a given phrase stress domain. This view of sentence stress as a phonological rule was challenged by Bolinger (1972). He argued that accents are not predictable because the speaker him/herself determines the position of the accent, and the accent can be placed anywhere.[7]

Gussenhoven (1983) and Selkirk (1995) posited focus projection to resolve this issue (Ladd, 1996). Gussenhoven (1983) proposed the Sentence Accent Assignment Rule (SAAR), postulating the notion of *focus* which is distinguished

[7] In Bolinger's view, a focused word directly means an accented word, which denies the application of the sentence stress assignment rule. However, the present research follows "Structure based Focus to Accent" position (Ladd, 1996, p. 163). According to Ladd (1996), there are two possible ways to consider the accentuation of broad focus. Structure based FTA (e.g., Gussenhoven, 1983) assumes two separate levels such as focus and accent, and language-specific rules are applied to the accentuation of broad focus. On the other hand, Highlighting based Focus to Accent position does not allow for language-specific rules. In other words, The Highlighting based FTA position denies the premise that sentence level stress can be determined by a linguistic rule. According to this view of sentence level prominence, the default accent assigned at the end of the prosodic domain is more important than other items, thus it is highlighted.

from accent. According to this view, focus is an operational feature at the sentence level, specifically related to the argument structure. According to SAAR, within the focus domain of a verb followed by an object, the accent falls on the object only. This single accent on the object alone does not mean that the verb is not under focus as the focus is projected from the accented word to the whole focus domain.

Selkirk (1995) also proposed a theory for the relationship between focus and accent, making use of the licensing of F-marking. According to this view, if an item is accented, then it is also F-marked. This F-marking is projected onto the focus domain, as described in (5) (p. 555).

(5) Focus Projection

(a) F-marking of the *head* of a phrase licenses the F-marking of the phrase.

(b) F-marking of an *internal argument* of a head licenses the F-marking of the head.

Thus, "F-marked constituents which are not a Focus are interpreted as new in the discourse, while a constituent without F-marking is interpreted as given" (p. 556). What is important here is that Selkirk (1995) integrated the notion of given and new information (Heusinger, 1999). In Selkirk (1995), the Pitch Accent

Prominence Rule (PAPR)[8] applies ahead of the NSR, reflecting information structure.[9] The NSR applies only when all of the words in an utterance are new or given in an utterance.

According to Birch and Clifton (1995), listeners can interpret a message through focus projection based on the accented word. In other words, the accented 'single' word is projected to the whole unit of new information, and listeners thereby understand what is new and what is given. This process has been known to affect the speech comprehension.

The relevance of information structure (i.e., given and new information) and the sentence-level prosody of both English and Korean are discussed in more detail in the next section.

2.1.3 Givenness and Prosody in English and Korean

The assignment of sentence stress can be further refined in relation to information structure. The use of sentence stress reflects the informativeness of each item in

[8] The Pitch Accent Prominence Rule (PAPR, Selkirk, 1995, p. 563): "A syllable associated to a pitch accent has greater stress prominence than a syllable which is not associated to a pitch accent. A syllable associated to a pitch accent has greater stress prominence than a syllable which is not associated to a pitch accent."

[9] Heusinger (1999) mentions that the PAPR is "a purely discourse-semantic determination of sentence accent assignment" (p. 89).

each sentence at the discourse level, which is directly determined by the ongoing discourse content (Fusch, 1984; Halliday, 1967).

The distinction between given and new information needs to be explained to understand the nature of sentence stress. Generally, sentence stress is assigned to the element presenting new information, and elements presenting given information are deaccented (Halliday, 1967). In the case that there are several elements within a prosodic phrase presenting new information, the last of these is given prominence (Ladd, 1996). The definitions of "givenness" and "newness" of information have been proposed in a range of different ways by researchers (the classification adopted from Baumann, 2006): Givenness as shared knowledge (Prince, 1981), givenness as saliency (Chafe, 1976), givenness as predictability/recoverability (Prince, 1981), hearer-old and hearer-new, discourse-old and discourse-new (Prince, 1992), and hierarchy in givenness (Gundel et al., 1993). Furthermore, Fuchs (1984) suggested that the factual new and given may not entirely determine the accentuation. A speaker may deliberately leave the first newly-mentioned item unaccented and let the listener consider it as given, which implies that one cannot necessarily understand the utterance solely depending on the distinction between factual given and new.

The previous research reviewed above suggested that it is not always straightforward to determine the qualification of given entities. The present study

adopts the definition of given and new information offered by Halliday and Greaves (2008), with the notions of tonality and tonicity. According to them, the term *given* roughly refers to the entities that are "known or at least recoverable to the listener" (Halliday & Greaves, 2008, p. 102). At the discourse level, the speaker organizes his or her speech into several information units consisting of given and new information with given being optional. An information unit is prosodically reflected in terms of tonality (i.e., tone unit), which is the domain of tone assignment (i.e., of sentence stress). In English, the intonation pattern is largely determined by decisions regarding the placement of nuclear accent (Wells, 2006). Tonic prominence falls on a syllable, and the choice of a syllable for placing tonic prominence is referred to as tonicity (Halliday & Greaves, 2008). A single information unit (tonality) most often corresponds to a clause at the grammatical level, but not always (60% of the time, according to Halliday & Greaves, 2008). Tonality is said to be unmarked if an information unit matches with the clause boundaries. Figure 2.1 shows the most common information unit structure in English.

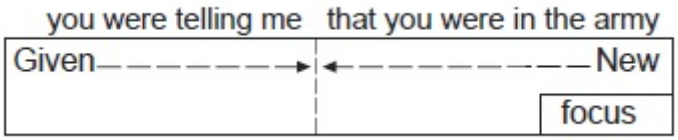

Figure 2.1 A Typical Information Unit in English Discourse
(Halliday & Greaves, 2008, p. 102)

Focus in Figure 2.1 indicates information focus that the speaker wishes the most attention to be given to the relevant element, and this is usually placed at the end of information unit in English. Within the same information unit, any entities following the focus are to be regarded as given, as in Figure 2.2.

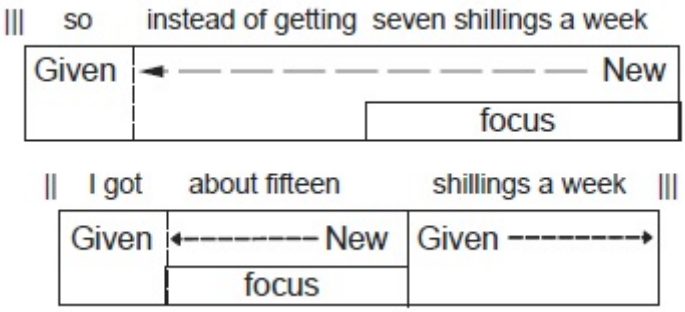

Figure 2.2 An Information Unit in English Discourse
(Halliday & Greaves, 2008, p. 103)

Research has suggested that focus marking is realized in different ways across languages. According to MacWhinney and Bates (1978), English children preferred prosodic realization over other structural devices, and used more

emphatic stress for new items, than the Hungarian children did, whose native language allows free word order. The Hungarian children hardly assigned prominence to items with greater newness. These findings imply that Korean learners whose native language also makes use of scrambling,[10] may employ a prosodic device less frequently than do English speakers. Cutler (1984) stated that, in English, structural devices such as cleft sentences might aid comprehension, but they are "subordinate to prosodic focusing; accent overrides both discourse cues to what might be most important in the sentence, and syntactic cues" (p. 86). Furthermore, it has been shown that English children acquire this prosodic device at an early age with awareness of new and given information (Wieman, 1976).

Lambrecht (1994) further showed that languages vary in their marking of contrastive meaning *within* a word. For example, English allows stress shift (marked as capital letters in example (6) below) to express contrastive meaning within a word:

(6) There are adVANtages and DISadvantages. (Lambrecht, 1994, pp. 240-241)

[10] Scrambling means "free word order" (Ross, 1986, p. 53).

However, Spanish does not allow such contrastive stress shift in the same context. Further, this stress shift within a word is also available in English in the following derivational pairs (7):

(7) Is she ChiNESE? No, She's JAPAnese (Lambrecht, 1994, p. 241)

In contrast, German, which has similar adjective derivation, does not allow such stress shift. Lambrecht (1994) explained that "this difference between English and German may be a result of the fact that German has greater word-order flexibility than English, hence can express certain pragmatic contrasts syntactically rather than phonologically" (p. 241).

Baumann (2006) also mentioned that in Czech, which is a free word order language, a sentence is said to be unmarked when it begins with given information and concludes with new information, adding that there seems to be a more obvious correlation between sentence position and degree of informativeness in Czech than in English.

As mentioned above, the degree to which prosody is used to mark information structure is not universal. Languages also allow both syntactic and lexical options. Indeed, English itself has alternative strategies, such as cleft

sentences and dislocation to mark informational focus, but prosodic focus realization remains primary.

As for Korean, scrambling and morphological marking, as well as prosody are available for marking informational focus. Korean has a tendency to use scrambling to reflect information structure. Sohn (1999) describes that 'reordering' of Korean words takes place to signal pragmatic ("topicality or focus," p. 266) differences between nominal elements in the preverbal position. Choi (1997, cited from Jackson, 2008) proposed that a given element should precede a new element, and that this motivates scrambling in Korean. Furthermore, Jackson (2008) also suggested that contrastive focus motivates word order scrambling in Korean.

It is also widely known that Korean employs a certain kind of morphological marking of focus. Jun (2013) discussed how Korean concentrates on relational givenness rather than referential givenness, and this leads to the presence of explicit morphological marking for topic and focus, and the absence of such marking for referential given information. According to his discussion, the Korean morphological markers -*i*/*ka* and -*ul*/*lul* function as focus markers as well as case markers. Jun (2013) further explained that "English and German do not have such explicit markers for focus and topic, rather relying on prosodic features, but they do have explicit markers of referential givenness, namely the article system. Korean lacks an article system (p. 29)." It seems that the prosodic realization of

given vs. new information in English parallels the relational givenness of focus in Korean. This discrepancy may cause Korean native listeners to be less aware of the prosodic strategy in English, as they are used to depending on the consistent use of structural devices. Korean learners' difficulty in using the spoken features of English may derive from the different ways of managing the given vs. new information contrast, as well as the differences in rhythm between the two languages.

Note that Korean does manifest prosodic manipulation of focus marking. In the canonical word order (SOV), new information in the preverbal position has a higher pitch during the declination[11] along the sentence (Jackson, 2008), as in (8) below.

(8) Korean scrambling (Choi, 1997, cited in Jackson 2008, p. 26)

a. Mary-ka ecey John-ul manna-ss-e.
Mary-NOM yesterday John-ACC meet-PST-DC
'Mary met John yesterday.'

b. Mary-ka John-ul ecey manna-ss-e.
Mary-NOM John-ACC yesterday meet-PST-DC
'Mary met John yesterday.'

c. John-ul Mary-ka ecey manna-ss-e
John-ACC Mary-NOM yesterday meet-PST-DC
'Mary met John yesterday.'

[11] Declination is defined as "the downward trend of F0" in a given utterance (Ladd, 1996, p. 16)

In the sentences in (8), the preverbal elements consistently have pitch prominence. Along with the high pitch on new information preceding the verb, given information is moved ahead with no highlighting effect on the pitch declination (Choi, 1997, cited in Jackson, 2008). However, little is known about if and how prosodic prominence alone can signal new information, as scrambling accompanies the prosodic feature. Further, it is not clear which of these devices predominates in Korean.

In sum, the givenness that is the core element in determining sentence stress and intonation in English is differently realized across languages. Unlike English, whose major operational mechanism is prosody, Korean uses various markers of focus, such as scrambling, morphological marking, and prosody. The difficulties experienced by Korean EFL learners may have a more complex origin than simply the differences in rhythm. Rather, their unfamiliarity with English givenness prosody may play a role in affecting their overall intonation when speaking English.

2.1.4 Sentence Stress and Speech Comprehension

The contribution made by the (de)accentuation on new vs. given information to speech comprehension has been examined in a number of previous studies with English as a native language. Cutler (1976) first proposed that an auditory sentence processing model should be refined by including the role of sentence stress. Stated simply, auditory sentence processing involves three processes, namely word boundary segmentation, lexical interpretation, and syntactic boundary determination. Cutler (1976) claimed that native English listeners search for semantic focus, which is realized as sentence stress, along with the three, in sentence processing. This claim was supported by Cutler and Fodor (1979), whose study showed that, when listeners were provided with a *wh*-question (for narrow focus), they anticipated the focus position in the answer sentence. If the focus position corresponded to their expectation, they responded faster in the phoneme-monitoring task. These authors argued that the listeners were searching for the focused item during sentence comprehension, and their search was aided by their efficient perception of focused elements.

Bock and Mazzella (1983) tested the effect of inappropriate accent placement depending on new and given information on the comprehension of spoken English, and examined whether this effect extended to voice alternation in the sentence. The English native listeners showed significantly more rapid responses to sentences with appropriate sentence stress placement than to those

with misplaced accent or no accent, as well as those with no context provided. The findings held for active-passive alternations, and for both subject and object positions in the sentence. Terken and Nooteboom (1987) revealed that not only accentuation, but also the appropriate use of deaccentuation helps listeners to process new vs. given information. Such appropriate use reduced response latency.

Whereas the above studies worked with narrow focus, Birch and Clifton (1995) extended the findings on how speech comprehension is facilitated by appropriate given vs. new accentuation in broad focus conditions. These authors tested listeners' response time when required to judge the appropriateness of answer sentences with accentuation that was different or conflicting in the given context. The findings of reduced response time clearly showed that appropriate accentuation, reflecting information structure, facilitated the comprehension. Furthermore, a single accent on a new noun phrase was generally sufficient to signal the complete broad focus.

2.1.5 Acoustic Correlates of English and Korean Focus

Traditionally, pitch, or pitch movement, has been considered a major cue to signal accent for information structure. With substantial pitch variation, duration and intensity cues are also known to contribute to prominence (at either word or

sentence level) in both production and perception. Halliday and Greaves (2008, p. 103) defined sentence prominence as a combination of the following features in (9):

(9) a. either steeper pitch movement (on a straight tone, i.e. falling or rising) or change of direction (on a curved tone, i.e., fall-rise or rise-fall)
b. extended duration, and
c. slightly greater intensity

Cooper et al. (1985) and Eady and Cooper (1986) showed that English native speakers increase word duration of foci that carry contrastive information by 30 to 40%. It was also found that the f0 is substantially lowered in the transition to the post-focus items.

Similarly, it has been shown that speakers attenuate a word when it is repeated in a discourse – the word becomes given information and is easily recoverable or accessible. Flower and Housum (1987) measured the duration of words, mean f0, and peak amplitude of the lexically stressed vowel in words upon first (new) mention and upon second (given) mention. The findings showed that only word duration was consistently significant in the difference between new and given words. The words were consistently shorter when repeated than when first

mentioned. Sridhar et al. (2008) supported the results of Flower and Housum (1987) with the finding that word duration was the most salient feature in their study. These authors also reported that the distinguishing acoustic feature in contrastive focus was related to f0.

In terms of the perception of prominence, Turk and Sawusch (1996) found that in selective attention experiments, English native speakers attended to both duration and loudness variables in their perception of prominence, and that loudness cues were easily ignored when they attended to duration cues. These findings imply that duration cues are easily perceived and more stable in the perception of prominence, as was borne out by Turk and Sawusch's (1996) regression analysis, with a .544 change of variance for duration, and only a slight (thus, "negligible" in their term) .003 change of variance when the loudness variable was entered together. In contrast, Mo (2010) revealed that "overall intensity syntagmatically normalized in a dynamic window of 5 adjacent vowels" (p. 135) showed the highest predictive value when compared individually with other cues, although the duration cues were still the most consistent in affecting the perception of prominence, regardless of their normalizations (raw, syntagmatic, and paradigmatic).

Turning to Korean, focused elements are also acoustically modified. In Korean, the accentual phrase is the domain of focus realization. If an item is

focused, the boundary between the accentual phrase containing the focused item and the following accentual phrase is deleted. The process is known as ‘dephrasing’ (Jun, 1996). Therefore, the focused element forms a single constituent with the following non-focused element. The process sounds similar to the deaccentuation of given information in English, but the focused item in Korean is always phrase initial, which is exemplified in (10) below (Jun, 1996, p. 162).

(10) a. Mary-ka sakwa-l̈l məg̈in-ke anɨra pərjəsst’e

‘Mary-NOM’ ‘the apple-ACC’ ‘to eat-REL’ ‘is not, but’ ‘to throw-DEC’

= ‘Mary did not eat the apple but threw it out.’

→ {Mary-ka} {sakwa-l̈l} {məg̈in-ke anɨra} {pərjəsst’e}

In (10), “to eat” and “to throw” contrast with each other, and the accentual phrase after “to eat” is dephrased and incorporated onto the previous phrase with contrastive focus (Jun, 1996). However, it remains unclear whether Korean also marks the focus with the same degree of acoustic cue changes such as pitch, duration, and intensity.

Kang (1996) examined the use of acoustic cues in relating new and given information in Korean. Korean native speakers read dialogues, and the duration of words, peak f0, and amplitude were measured. The findings showed that the

Korean speakers did make use of these acoustic cues, as well as accentual phrasing, although the accentual phrasing strategy alone was significant when they were given dialogues with lexical markers for givenness. It seems that acoustic cues are employed when lexical or syntactic cues are not sufficient.

As for the acoustics for contrastive focus, however, it has been shown that Korean speakers do make use of acoustic cues such as duration or f0. Jun and Lee (1998) measured the pitch and duration of focused words and the words preceding and following them. All five Korean speakers in the study showed a reduction in pitch range after the focused words. These researchers also revealed that the dephrasing was not observed in every case, whereas pitch changes were more consistently observed. Furthermore, the initial syllable of a focused word at the beginning of an accentual phrase was always longer than that of the word not focused. Lee and Xu (2010) also confirmed that Korean makes use of all three acoustic measures, namely f0, duration, and intensity, to mark contrastive focus in comparison to post-focal words.

2.2 Prosody and L2 Speech Comprehensibility

In section 2.2.1, the overall goals of L2 English pronunciation instruction in a CLT approach are described. In section 2.2.2, research on L2 comprehensibility and

foreign-accentedness is reviewed. Finally, in section 2.2.3, factors considered important in L2 speech comprehensibility and foreign-accentedness are discussed.

2.2.1 L2 Pronunciation in Communicative Context

In the CLT paradigm, fluency tends to be valued more than accuracy, and some aspects of pronunciation are omitted in instruction due to the insignificance of their contribution to the communicative situation. The main point made about pronunciation in CLT is that strong foreign-accentedness does not necessarily hinder listeners' comprehension, or overall communication. The emphasis on pronunciation training within the context of communication has led to a number of changes in EFL teaching goals and methodologies. The foremost consideration in developing pronunciation teaching materials is to help learners to improve their speech comprehensibility in a meaningful context, rather than to remove their foreign-accentedness. Furthermore, suprasegmentals have received more focus in pronunciation teaching than phonemic aspects. This situation has naturally led pronunciation teaching materials to discourse level texts (Celce-Murcia et al., 1996). In this context, learners are generally required to produce English with greater fluency, without much consideration of accurate composition.

Along with these changes in the teaching paradigm, efforts have been made to propose standards for English as an International Language (EIL). Jenkins (2002), among others, has suggested certain core elements of pronunciation for English as a lingua franca. Among the core features suggested, the appropriate placement of tonic stress (i.e., sentence stress) is the only suprasegmental item along with consonant inventory with four modifications (e.g., the substitution of /θ/ and /ð/), two vowel characteristics (e.g., the distinction between long and short vowels), four consonant clusters features (e.g., no omission of initial cluster as in promising), and two phonetic requirements (e.g., the presence and absence of aspiration of voiceless stops depending on the phonological context) (pp. 96 – 97).

Suprasegmentals have been extensively studied in L2 phonetics research, and are even considered more important than segments, but little research has considered these features through the lens of communication. The fundamental aim of phonetic modification is to reduce both the effort required of the speaker and the load on the listener. Van Son et al. (1998) revealed that the frequent appearance of syllables and words affected the degree of reduction in their consonants and vowels. This finding can be interpreted as efforts toward communicative efficacy. Investigating the contribution of English sentence stress to L2 comprehensibility is a fruitful avenue of research in the field of L2 phonetics,

as the findings may directly inform improvements in EFL learners' communicative efficacy.

2.2.2 Comprehensibility and Foreign-Accentedness

The attempt to disassociate two key aspects of L2 pronunciation, namely strength of foreign-accentedness and perceived comprehensibility, stemmed from Munro and Derwing (1995a; 1999). Based on empirical evidence, these researchers showed that heavily accented speech may still be highly comprehensible. Ratings of foreign-accentedness were evenly distributed between 2 and 8 (where 1 represented 'no foreign accent' and 9 a 'very strong foreign accent'), whereas comprehensibility ratings were skewed toward the 1 to 3 range, suggesting that most of the speech samples were regarded as virtually fully comprehensible regardless of the degree of foreign-accentedness. These findings were replicated in their follow up study with non-native speakers of four different language backgrounds (Derwing & Munro, 1997).

The above results were confirmed again by Munro and Derwing (1995b), who tested the effect of foreign-accentedness and comprehensibility on sentence processing time. In a verification test of the truth value of a spoken utterance, response time was longer for English L1 listeners when they heard sentences

spoken by Mandarin ESL speakers with low comprehensibility scores and strong foreign-accentedness scores than when they heard sentences with high comprehensibility and weak foreign-accentedness. However, the differences in response time were significant only when the spoken sentence was rated as low in comprehensibility; strength of foreign-accentedness was not statistically meaningful.

According to Munro and Derwing (1995a), foreign-accentedness was shown to correlate with a wide variety of variables, such as phonemic errors, phonetic errors, intonation appropriateness, and grammatical errors. However, comprehensibility correlated most highly with intonation, followed by grammatical errors and phonemic errors.

Kang et al. (2010) have also confirmed the relative importance of suprasegmentals in comprehensibility. These authors presented comprehensive empirical evidence that 50 % of the variance in ratings of comprehensibility and oral proficiency can be accounted for by suprasegmental features.

Furthermore, the effect of suprasegmental instruction has been proved empirically by Derwing, Munro, and Wiebe (1998). These researchers compared two groups of L2 learners, those who received segment focused instruction, and those who received suprasegmental focused instruction. Both groups showed significant improvement in both foreign-accentedness and comprehensibility at

sentence level. However, only the suprasegmental instruction group showed significant improvement in comprehensibility at the discourse level.

In sum, evidence suggests that strong foreign-accentedness does not necessarily decrease the comprehensibility of non-native speech, nor does it cause processing difficulties for native English listeners. Furthermore, comprehensibility is more closely related to intonation and to structural aspects of learner language, whereas phonetic/phonemic difficulties interfere with the accuracy of pronunciation.

2.2.3 Predictors of Comprehensibility and Foreign-Accentedness

There has been much research on the factors predicting foreign-accentedness and comprehensibility. The relative contribution of each suprasegmental feature to foreign-accentedness and comprehensibility has been the focus of research related to age of arrival (AOA) and length of residence (LOR) variables.

A comprehensive study by Flege et al. (1995) revealed that higher AOA led to stronger foreign-accentedness, showing a negative correlation between AOA and foreign-accentedness. Trofimovich and Baker (2006), in turn, examined the effect of LOR in the US (3 months, 3 years, and 10 years) among adult native speakers of Korean on their production of suprasegmentals namely stress timing,

peak alignment, speech rate, and pause frequency and duration and on their foreign-accentedness ratings. Regression analysis revealed that pause duration and speech rate were the most powerful predictors of foreign-accentedness.

Further research by Trofimovich and Baker (2007) focused on 20 Korean L1 children whose LOR in the US varied (1 vs. 11 years). Increased LOR was shown to contribute to the development of the same five English suprasegmentals measured in Trofimovich and Baker (2006). In addition, Korean L1 speakers who had arrived in the US in their childhood and stayed 11 years did not differ significantly from English L1 adults in terms of four of these suprasegmentals; only speech rate was slower, implying that this is a difficult suprasegmental feature to master. A single linear regression analysis of each suprasegmental to accentedness ratings indicated that speech rate was the best predictor of accentedness, followed by pause duration.

The role of speech rate as a significant factor in judging foreign-accentedness and comprehensibility has been actively investigated in L2 speech research. Munro and Derwing (1998) carried out two experiments on the effect of speech rate on foreign-accentedness judgments. They expected that the slower rate of non-native speech would be of benefit in terms of accentedness, but when slowed speech materials were presented to native English listeners, they were rated as more accented than when spoken at the normal rate. Furthermore, when foreign-

accented non-native speech materials were manipulated to make the speech rate equivalent to that of native speakers, they were perceived as too fast. It seems that the 'optimally' slower rate of non-native speech may be better understood by native listeners. Munro and Derwing (2001) continued their previous research on the speech rate variable, and found that the optimal rate would be 4.76 and 4.23 syllables per second for foreign-accentedness and comprehensibility, respectively. Furthermore, increasing the non-native speech rate by 10% resulted in improved comprehensibility and reduced perception of accentedness.

The importance of speech rate and pause use has been underlined by recent research to determine the relative significance of several suprasegmental aspects of speech. In Kang (2010), a total of 11 suprasegmental variables (including variables of speech rate, pause use, prominence, and pitch range) were tested in terms of their contribution to foreign-accentedness and comprehensibility. In the final regression model of foreign-accentedness, overall pitch range, which was measured from syllables with prominence, was the most powerful predictor. A wider pitch range reduced the perceived degree of foreign accent. She calculated pace (the number of prominent points per minute) and space (the proportion of the prominent word to the total number of words produced) for English rhythm measurements (Vanderplank, 1993), and found space alone to be significant, but in such a way that more frequent prominence increased perceived accentedness.

The other predictors of accentedness were pause and speech rate variables. For the comprehensibility model, three speech rate variables and one pause related variable were shown to have a significant effect.

Isaacs and Trofimovich (2012) and Trofimovich and Isaacs (2012) approached the issue in a comprehensive manner, including vocabulary, grammatical, and discourse factors. For foreign-accentedness, rhythm (vowel reduction) and word stress were the most powerful predictors in stepwise multiple regression, whereas type frequency, word stress, and grammatical accuracy were the best predictors of comprehensibility ratings (Trofimovich & Isaacs, 2012).

Kang et al. (2010) might be considered the most comprehensive study on suprasegmental factors affecting comprehensibility. These researchers measured a total of 29 variables of prosody and fluency in L2 speech collected from the TOEFL speaking test. A suprasegmental fluency cluster variable including mid-falling tone choices, pace, mean length of run, phonation time ratio, articulation rate, and syllables per second proved to be the strongest (β= 1.26) predictor of comprehensibility, followed by boundary markers, unit completeness, mid-rising tones, and high-rising tones on tonic syllables. Prominence characteristics were also measured as the proportion of sentence-final default placement of sentence stress. This variable also positively changed the variances (β= .29). However, pitch

height variables, including pitch on lexical items presenting new and given information, negatively correlated with comprehensibility ratings.

Saito et al. (2015) studied the predictors of accentedness and comprehensibility in terms of the oral proficiency of non-native speakers, and showed that learners with different ability levels showed different correlates.

As can be seen above, the research in this field tends to be more concerned with suprasegmentals in L2 speech, whereas the interference from non-native segmental errors is still under investigation, and has produced meaningful findings. Recent research by Saito (2011) using "loaded (with difficult segments for Japanese learners)" and "non-loaded (without those problematic segments)" sentences has provided evidence that segment pronunciation also affects comprehensibility as well as foreign-accentedness.

2.3 Sentence Stress in L2 Speech

This section describes previous research on sentence stress in the L2 context, which is directly related to the research questions of the present study. In section 2.3.1, the effect of sentence stress on L2 speech comprehensibility is more closely examined. In section 2.3.2, the research on English sentence stress in the speech of Korean EFL learners is reviewed.

2.3.1 Sentence Stress and L2 Comprehensibility

With regard to the what and how of pronunciation instruction in the EFL context, the fundamental aim of communication, i.e., to convey/exchange information/a message, should be considered first. Therefore, the characteristics of spoken language attended to in L2 pronunciation instruction should be based on what contributes to success in being understood by the listener.

Sentence stress is the pronunciation factor that most directly affects speech comprehension in English (Cutler, 1976, among others). Sentence stress highlights new or important information, and native English listeners' attention is focused on those words during comprehension (Halliday, 1967). The use of sentence stress is also partially related to the use of pauses during speech. Native speakers sometimes place a brief pause before or after the word to which they wish to call listeners' attention (Hahn & Dickerson, 1999). The most frequent problem manifested by Korean learners in their English production is the equal emphasis on every content word (Um et al., 2001), possibly along with the over-use of pauses. These practices hinder comprehension by native speakers of English. As has been shown by research on sentence stress and speech comprehension in L1 English, native English listeners anticipate the sentence stress on items

representing new information (Bock & Mazzella, 1983; Birch & Clifton, 1995). A proliferation of pauses leads to inappropriately frequent points of sentence stress. This hinders native listeners' evaluation of the information structure in L2 speech, resulting in comprehension difficulties (Hahn & Dickerson, 1999).

The first attempt to investigate the contribution of sentence stress appropriateness to speech comprehension in the L2 context was the study by Hahn (2004). In Hahn's (2004) study, three versions of a text were prepared: one with appropriate sentence stress placement, another with no sentence stress, and a third with sentence stress placed on incorrect items. A Korean L1 teaching assistant read the three texts, and English L1 undergraduates' content processing and comprehension were measured. The native listeners' reaction time was quickest when a tone was heard during the text with appropriately placed sentence stress, while it was slowest for a tone with misplaced sentence stress. These findings imply that the proper use of sentence stress reduced the cognitive load of the listeners in processing the content, enabling them to react faster to the tones. The listeners were also shown to remember more of the content of the text in the well-placed sentence stress condition.

In discussing the role of sentence stress appropriacy in L2 speech comprehensibility, however, it is significant to verify the importance of sentence stress in comparison to other verified significant factors. Kang (2010), in a

comparison of 11 suprasegmental features, included pace (the number of prominent points per minute) and space (the proportion of the prominent word to the total number of words produced) as stress-timing variables. The appropriateness of prominence placement was not considered. The use of prominence was found not to exert any significant influence on comprehensibility ratings. In addition, more frequent use of prominence indicated a stronger perceived foreign-accentedness. Possibly, the speakers in Kang's (2010) study used many misplaced sentence stresses. Furthermore, the study included Chinese and Japanese participants whose native languages employ lexical tones or pitch accents on every word, and their different language backgrounds may have influenced their use of prominence.

Kang et al. (2010) included pitch height factors in their study, including f0 at new and given words, average height of prominent words and non-prominent words, paratone onsets and terminations, and overall pitch range. The findings showed that the pitch height factors as a whole had a negative effect on oral proficiency and comprehensibility ratings. They interpreted the findings as reflecting the participants' individual characteristics of pitch height, and not in relation to comprehensibility. Also, they measured pitch movement patterns on tonic syllables (such as mid-rising, and high-level, etc.) and the percentage of unmarked sentence stress, where the sentence stress is on the final position of the

given tone unit, and the two factors were also proved to significantly predict the L2 speech comprehensibility scores. Furthermore, in considering the pedagogical implications in the L2 context, the appropriate placement of sentence stress, which is more teachable, would bear more significance than the description of phonetic and phonological characteristics of learners' speech.

There is no previous research that directly compares sentence stress appropriacy in a given context to other major factors in L2 comprehensibility and foreign-accentedness. The present study includes the appropriateness of sentence stress in Korean EFL learners' speech, and compares it to other relevant variables of L2 speech comprehensibility and foreign-accentedness.

Moreover, little empirical research has been reported on the contribution of stress timing of English to speech comprehension. Stress-timed speech, mainly indicated by vowel reduction, may be subsidiary to sentence stress placement. For language teaching purposes, it may be important to distinguish between factors that directly affect language comprehension and those that simply result from speech organization. It is also difficult to teach stress timing, as the distinction between syllable timing and stress timing is somewhat arbitrary, with languages being placed at points along a continuum (Deterding, 2001). I believe that to determine the factors that influence speech comprehensibility and apply them to L2 instruction, those aspects affecting language comprehension should first be

identified by means of a thorough review of the literature, rather than depending on the physical manifestation in spoken language.

2.3.2 Sentence Stress in L2 Production

The English focus marking system is complicated for ESL/EFL learners to acquire, as it "involves the interplay between the phonetic, phonological, syntactic, and pragmatic systems", whereas the acquisition of phonemes entails only phonetics and phonology (Baker, 2010, p. 23).

Wennerstrom (1994) investigated non-native speakers' use of high pitch accent (prominence on new and contrastive information) and low pitch accent (deaccentuation of given information), and revealed that they generally did not make systematic use of pitch to accent and deaccent certain items, as do native speakers. In her follow-up research on the relationship between the use of prosody and global language test results, Wennerstrom (1998) found that pitch use was not a significant factor in global language skills, but did present data showing that higher and lower level speakers differed in their use of pitch to indicate contrastive and given information.

Taniguchi (2001) showed that Japanese EFL learners regularly placed sentence stress on the final item in a sentence, thereby stressing given information.

Subsequent research with Shibata (2007) indicated that Japanese learners of English showed a substantial discrepancy between their knowledge of the placement of sentence stress and their actual use of sentence stress. The participants were found to have difficulty in prosodically realizing sentence stress reflecting their intended meaning.

Baker (2010) conducted a comprehensive study on the production and perception of English prominence by Korean and Mandarin native speakers. In the test of sentence stress prediction in narrow and broad focus, Korean learners (who were late arrivals in the U.S. and stayed for about two years on average) predicted English sentence stress almost as correctly in all three focus types (narrow focus, sentence broad focus, and VP broad focus) as English native speakers. Further, they performed better than Mandarin speakers did in verb phrases and sentences with broad focus. However, in a perception experiment by English listeners, Korean learners' sentence stress production in broad focus was perceived to be less appropriate than that of both English and Mandarin native speakers. It seems that Korean ESL learners are aware of the appropriate placement of English sentence stress, but they have problems with the phonetic realization of the prominence.

In the EFL context, Um et al. (2001) showed that Korean EFL learners were unaware of the appropriate place for prominence in instances of broad and narrow

focus where the experimental context included only questions and answers. Kim (1998) investigated Korean EFL learners' use of f0 in presenting new vs. given information, emphasis, and contrastive information, and found that they did not make use of f0 to realize sentence stress. Kim (2004) compared pitch peak realization in narrow and broad focus and deaccentuation of given information, and found that Korean EFL speakers were unable to perform the different placement of pitch accent based on focus and information status. They consistently assigned pitch accent to every content word. These findings imply that deaccentuation of given information was not a possibility for these Korean EFL speakers. It was also shown that Korean learners performed worse on accentuation of function words in contrastive focus than on content words. Choi and Jang (2007) measured Korean EFL learners' f0 peak and duration of lexically stressed vowels under focus. The results indicated that the learners did not make adequate use of f0 and duration to mark focus. Kim (2007) compared the use of vowel duration, f0, and intensity between Korean learners and native speakers. In her study, it was found that Korean learners used higher pitch to realize sentence stress than native speakers did, while they did not lengthen the vowel duration as much as the native speaker did.

CHAPTER 3 SENTENCE STRESS AND L2 COMPREHENSIBILITY

This chapter presents the experiment and the analysis of the data to determine the contribution of English sentence stress appropriacy to L2 speech comprehensibility. First, section 3.1 describes the methodology of the experiment. Section 3.2 introduces hypotheses on the first research question. Section 3.3 shows the results. Finally, section 3.4 concludes this chapter by discussing those results.

3.1 Methodology

This chapter examines the relative contribution of English sentence stress appropriacy to L2 speech comprehensibility employing stepwise multiple regression analysis. In the L2 context, especially in the EFL context, it is essential to sort out significant predictors of comprehensibility from those of foreign-accentedness, to help learners be understood in a more efficient way. Details of the method are given in the following sections.

3.1.1 Speakers

Thirty-nine Korean speakers participated. They were enrolled at a university in Seoul as undergraduate or graduate students at the time of recording. All of them were female students. This was to avoid gender-related confounding variables in speech analysis. Among the 39 participants, 21 had experience in an English-speaking country (or had attended international schools), with various length of residence (LOR) and age of arrival (AOA). One of them was a Korean–English bilingual speaker, who had been born in the Northern Mariana Islands.[12] Eighteen participants had no experience in an English-speaking country. Of the 39 students, only 35 participants' read speech turned out to be adequate for inclusion in terms of comprehensibility and foreign-accentedness ratings. Among the four excluded, one had severely unintelligible segment pronunciation, while the other three had noticeable British accents, which might have affected the foreign-accentedness ratings, as the listeners were all native speakers of North American English.[13] Table 3.1 below shows the participants and their LOR and AOA.

[12] This participant was given 6.6 for comprehensibility and 6 for foreign-accentedness on a 7-point scale, which indicates quite a noticeable difference in pronunciation from a native-speaker norm. Listeners indicated that she showed slight differences in articulation of some phonemes, such as /r/ and *th*-sounds, from those of American native speakers.

[13] In a pilot study, native speakers of American English got confused about the criteria of foreign-accentedness regarding these speakers.

Table 3.1 *Participant Information for Experiment 1*

Group	Length of Residence	Age (S.D)	Age of Arrival	*N*
Long Residence	8 ~ 19 years	24 (5.7)	0[14] ~ 18	8 (9)
Experienced	1.5 months ~ 2 years	27 (6.3)	5 ~ 38	10 (12)
Inexperienced	none	22 (1.8)		17 (18)
Total				35 (39)

Note. *N* refers to the number of Korean learners who are included in the analysis after excluding the four speakers, and those in the parentheses mean the number of the participants who participated in recording before excluding the four.

In the Long Residence Group, five participants were majoring in English or foreign language education at the time of recording, three were science majors, and one was a social science major. Six of the twelve participants in the Experienced Group were English majors, four were social science majors, and two were science majors. In the Inexperienced Group, three participants were majoring in foreign language education; the other 15 participants included five social science majors, three engineering majors, two Korean majors, one history, one food and nutrition, one medicine, one nursing, and one art major. It was expected that participants with different English-learning backgrounds would manifest a wide range of spoken-language features.

[14] AOA 0 ~ 18 includes one participant of age 0 from the Northern Mariana Islands, who is Korean–English bilingual.

A male native speaker participated as an interlocutor for dialogue reading. He was born and raised in Florida, U.S., and was 25 years old at the time of recording.

3.1.2 Recordings

Recording was conducted in a soundproof facility using a SONY PCM-M10 recorder with a built-in microphone.

To control vocabulary and grammatical structure effects, a reading task was chosen for this experiment, since the two (vocabulary and grammar) are critical factors of speech comprehensibility judgment (Trofimovich & Isaacs, 2012, among others). Some may argue that a reading task may result in unnatural production of the target dialogue and may thus hinder the valid rating of the speech material. However, Munro and Derwing (1994) found that foreign-accentedness ratings do not statistically differ between extemporaneous and read speech when vocabulary and grammar used are within the limit of the learners' familiarity or language ability. The level of difficulty of the dialogue used in the study was easy enough to elicit from the participants natural and fully understood utterances.[15]

[15] See Appendix A for the dialogue.

A delayed sentence repetition task, which is sometimes employed in L2 suprasegmental research (Trofimovich & Baker, 2006, among others) was not workable for this research, since the material used was at the discourse level. Nevertheless, natural speech samples are very important in testing perceived L2 pronunciation. Therefore, to avoid possible effects of read speech, the delayed repetition task was modified and applied to the reading task using the following procedures.

First, before recording, the Korean participants were given enough time to read through and understand the target dialogue; then, they read the dialogue with the male native speaker of English at the beginning of the recording procedure. Second, they read 34 other short dialogues (for Experiment 2). Finally, they reversed turns (that is, read each other's parts) in speaking the target dialogue and read it again; these data were used in the analysis conducted for this experiment (Experiment 1). In this way, natural speech samples were obtainable and imitation of the native male speaker's intonation could be avoided.

The dialogue was from Kreidler (2004), in which the placement of English sentence stress was explicitly explained. A slight modification was made by the researcher to the placement of contrastive focus, the reason for which is explained in the footnote in Appendix A. Forward slashes express tonalities; these marks were inserted for the readers' reference, and the Korean learners were provided

with the dialogue without any marks of sentence stress position or prosodic boundaries.

In testing sentence stress appropriacy as a predictor of comprehensibility, a strictly controlled discourse-level utterance is needed. To support the adequacy of the research design, therefore, spontaneous speech samples from the same participants were also collected, for which participants were provided with a picture and asked to describe designated parts of it. However, the examination of spontaneous speech is still desirable, and this problem needs to be resolved with a more refined design in future research.

3.1.3 Listeners

Ten native speakers of American English participated as listeners; they scored utterances along a seven-point Likert-type scale of comprehensibility for all 35 Korean-speakers' read speech. The same listeners rated foreign-accentedness to allow comparison of how sentence stress appropriacy works similarly or differently with respect to these two evaluative norms.[16] Seven of the listeners were then teaching or had previously taught English at a school or university in

[16] See Appendix B for the rating criteria for comprehensibility and foreign-accentedness, and instructions given to the listeners. The specific description of each evaluative norm followed Kang (2010) with a little modification (which is marked in italics).

Korea, while three were graduate students at a university in Seoul with no English teaching experience at the time of rating. All but one reported that they were familiar with Korean-accented English. The ratings were conducted individually in a quiet room with the researcher. Before starting the ratings of the actual data, they were given five practice rating tasks.[17] A speech sample from one female native speaker of English, born and raised in Canada, was also included to provide raters with a baseline and to test the validity of their rating. During the rating procedure, the researcher played a sound file and waited for the rater to mark foreign-accentedness and comprehensibility; the file was replayed when the listener asked, but most listeners completed the full set of ratings without replaying. Information on the listeners is presented in the following Table 3.2.

[17] The raters on comprehensibility and foreign-accentedness studies are effective listeners, and much research has employed naïve listeners who had not undergone any training in the ratings.

Table 3.2 *Listener Information for Experiment 1*

no.	Gender	Born	Length of Residence in Korea
1	male	Canada	10 years
2	male	Canada	8 years
3	female	Canada	8 years
4	male	USA	2 and a half years
5	female	USA	23 months
6	female	USA	10 months
7	male	USA	5 years and 2 months
8	male	USA	5 years
9	female	USA	4 months
10	male	USA	4 years

3.1.4 Variables

A total of seven suprasegmental variables were measured and calculated: sentence stress appropriacy ratio, space (frequency of prominence), pitch range, number of silent pauses, total duration of silent pauses, mean length of run, and articulation rate. Details of the measurements are described in A–E below.

A. Sentence Stress (SS) Appropriacy Ratio

= N of appropriate placements of sentence stress observed / N of expected sentence stress placements

To calculate the appropriacy of sentence stress use, first, the participants' speech samples were marked for prominence by four native speakers of American English (one female and three male), all of them born and raised in the United States. They were all linguistics majors and had all taken phonetics or phonology courses. Therefore, they already had some knowledge of prominence.[18] The four native listeners heard each sentence of the dialogue produced by the participants, and marked prominent words and prosodic boundaries on pieces of paper. These prominence-marking procedures were adopted from Mo's (2010) Rapid Prosody Transcription (RPT) technique, with some modifications to fit the research methodology of the present study. The participants in RPT were a number of naïve listeners who had not been trained in ToBI transcription, and marked prominence and boundaries solely based on their auditory perception. This procedure showed high reliability among listeners in terms of perception of prominence and boundaries.

[18] A pilot procedure had been carried out with a naïve native listener to test prominence-marking procedures, but the listener had difficulty grasping the concept of prominence. In addition, given that only a small number of listeners were available in our Korean context, it was deemed by the researcher that native listeners with some background knowledge would be more appropriate for this study to ensure familiarity with prominence.

In detail, the procedure employed in the present research is as follows.[19] The native listeners were provided with a script of parts of the speech, sentence by sentence in a randomized order, but not the whole dialogue, so that they would be able to avoid their own expectations of sentence stress placement. Sentences may potentially have had more than one tonality (and indeed, some did), which is a matter that falls under the domain of tone assignment. Therefore, listeners were first asked to mark boundaries to indicate prosodic chunks, if there were any. Next, they were told to circle the most prominent word in a chunk; if they could not hear any prominence in a chunk, they just left the chunk unmarked. Speech errors such as false starts and pauses were also included in the transcription of the participants' read speech.

Words were accepted as 'prominent' by the study only when three or more native listeners agreed on the placement of prominence. Among the words determined to bear prominence, the number of correct placements was divided by the total number of expected sentence stresses (N=13). It was expected that the increase in the accuracy of sentence stress placement would enhance the comprehensibility of the participants' speech.

[19] See Mo (2010) for a detailed description of the RPT and its procedure.

B. Prominence Frequency (Space)

For the variable of prominence frequency in the Korean learners' speech, space was measured (Vanderplank, 1993), calculated as the number of prominent words out of the total number of the words. In this case, the appropriateness of the placement was not considered. Vanderplank (1993) originally suggested that *pace* (the number of prominence occurrence per minute) and *space* be used to measure English rhythm, and Kang (2010) showed that space alone had a significant correlation to foreign-accentedness; that is, the greater the proportion of prominent words the L2 speaker produced, the more severe his or her foreign accent appeared to the native listeners. However, since the speakers in Kang (2010) were international teaching assistants with various linguistic backgrounds including three Chinese, two Japanese, two Arabic, one Korean, one Russian, one Hindi, and one Nepali, these results are unlikely to be reflected among participants with a single native language. If different L1 backgrounds are excluded and prominence appropriacy is factored in, there will be different results. Pace was also calculated, but the variable showed multicollinearity[20] with other variables, and as in previous research space alone had been shown to be significant, the researcher decided that pace should be excluded from the analysis to avoid possible problems

[20] Multicollinearity refers to "the degree of overlap among predictor variables in a multiple regression. High multicollinearity among the predictor variables can cause difficulties finding unique relations among predictors and the dependent variable" (Urdan, 2005, pp. 159–160).

in multiple regression analysis. Therefore, only the space variable was included in the experiment.

C. Pitch Range

Pitch range was calculated as the average of difference between maximum and minimum f0 for each sentence of the dialogue. Narrow pitch range inevitably denotes insufficiently realized prosodic aspects, such as prominence, boundary tones, and paratones. This variable was adopted to examine if changes in voice pitch would benefit learner speech comprehensibility (or foreign-accentedness), following Kang (2010) and Trofimovich and Isaacs (2012). In Trofimovich and Isaacs (2012), this variable was not found to be significant in a correlation test for French-native learners of English. In that study, it seemed that the pitch range of the participants was measured on the basis of the whole discourse to see the effect of paratones. Kang (2010) measured overall pitch range based on the maximum and minimum f0 of prominent syllables, and revealed that foreign-accentedness was best predicted by overall pitch range. Korean native speakers are known to have more compressed speech compared to English native speakers (Kang, et al., 2012). Kang, et al. (2012) reported that Korean learners with about five years' ESL education showed more resemblance to native speakers in terms of overall pitch range, showing that the overall pitch range of the target language is also learnable.

In the present study, individual measurements were conducted on each sentence to look for any effect of sentence-level intonation realization. The measurements were conducted using Praat speech analysis software (version 5.3.82), and the voicing threshold was set at 0.7 in order for the pitch errors at the edge of the vowels to be eliminated (Yang, 2003).

D. Pause

Pauses were measured in two phases. First, the total number of pauses was counted, with a "pause" defined as a silence of above 0.1 seconds by Kang (2010) and Trofimovich and Isaacs (2006) within a tonality, which was defined by Kreidler (2004). This means that pauses at tonality boundaries were excluded from counting. Pauses of 0.1 seconds and shorter were considered as silence needed for articulatory processes, following Kang (2010). Trofimovich and Baker (2006) also defined a pause as a silence of above 0.1 seconds following the measure of pausological studies. Second, the durations of all of the pauses above 0.1 seconds were summed up, producing a total duration of silent pauses. In this case, any pauses above 0.1 seconds were included in the calculation. The pause duration variable was significantly correlated with foreign-accentedness in Trofimovich and Baker (2006), with the duration of pauses as a significant predictor of foreign-accentedness in the final regression model of predictors. Trofimovich and Isaacs

(2012) indicated further that the total number of silent pauses over 0.4 seconds was weakly but significantly correlated with comprehensibility, but not with foreign-accentedness. In addition, the pause error measures in their study, which counted the number of pauses within a clause and not corresponding to the grammatical unit, showed a significant, moderate correlation with both comprehensibility and foreign-accentedness.

The present research counted the number of pauses within a tonality, since pauses can signal the tonality of an utterance; pauses at boundaries may not sound as awkward as those in other places. Any syntactic boundaries were not considered. This variable reflects some tonality characteristics of the participants' read speech, while the second pause variable, total duration of pauses, provides solely a quantitative perspective. In this research, the participants did not frequently produce filled pauses, such as *uuh* or *hmm*. Only two cases of filled pauses were identified, and therefore the use of filled pauses was not considered separately from that of silent pauses.[21]

[21] Two filled pauses were observed at the boundary between clauses, and thus were not counted in the number of pauses but had their duration summed together with other pauses.

E. Speech Rate

Two measures of speech rate were included in the experiment. First, mean length of run (MLR) was calculated, based on the average number of syllables between pauses above 0.1 seconds. Second, the articulation rate, that is, the average number of syllables per minute when pause time was excluded, was calculated. These two measures were revealed to be strong predictors of comprehensibility by Kang (2010). Originally, syllables per second and phonation–time ratio were also calculated as speech rate measures, but multicollinearity testing showed that some of the variables were highly correlated and could be predicted from the others. Therefore, syllables per second, which had the highest variance inflation factor (VIF)[22] value and which did not show significance to comprehensibility in Kang (2010), were first excluded. In Kang (2010), the other three speech rate variables—MLR, articulation rate, and phonation–time ratio—all revealed a contribution to comprehensibility. However, these variables still showed high multicollinearity when considered all together in the present research. Therefore, phonation ratio was excluded in the regression analysis, since MLR and articulation rate were the first two variables entered in the regression model in Kang (2010).

[22] VIF value indicates the degree or severity of multicollinearity among the independent variables in a regression model (O'Brien, 2007).

3.1.5 Statistical Treatment

Stepwise multiple regression analyses were conducted to reveal the significant predictors of L2 speech comprehensibility. The experiment ultimately included 35 participants with one comprehensibility and one foreign-accentedness score for each subject as dependent variables.[23] To conduct the stepwise multiple regression analysis, with seven final independent variables, VIF values were maintained under 10. The distribution of each independent variable was normal, with kurtosis[24] values under 2. In addition, each variable showed a more or less linear distribution in terms of the dependent variable comprehensibility score, which meets the assumption of multiple linear regression analysis. Two separate stepwise multiple regression analyses were performed using SPSS 22, each with

[23] One might consider that each rating score, for each of the 10 raters, could be a dependent variable, rather than averages, and there is some research from this perspective. For example, Kang (2010) performed stepwise multiple regression with 11 speech samples x 58 raters for 11 suprasegmental and fluency independent variables. However, the focus of those studies was on how each rater responded to the same limited set of speech samples. It seems that this posits a research question somewhat different from my own, whose focus is on how learners' speech comprehensibility is defined in terms of several suprasegmental and fluency factors. In sum, I believe that the comprehensibility and foreign-accentedness scores for each learner participant should be averaged ones. This is also in line with the research methodology employed in Trofimovich and Baker (2006) and Trofimovich and Isaacs (2012).

[24] Kurtosis refers to "the shape of a distribution of scores in terms of its flatness or peakedness" (Urdan, 2005, p. 31).

seven independent variables and one dependent variable (comprehensibility score/foreign-accentedness score).

3.2 Predictions

Two predictions were made on the basis of the research question.

(1) The results found in previous research showing that speech rate and pause use are strong predictors of comprehensibility and foreign-accentedness will be confirmed in my study.

(2) Sentence stress appropriacy will be another significant predictor of the comprehensibility of Korean learners' speech.

As described in chapter 2, sentence stress appropriacy facilitates the comprehension of an utterance at the discourse level; this communicative value of sentence stress has been confirmed in L1 and L2 studies. Thus, if learners' sentence stress appropriacy is adequately measured, it will be natural for this variable to be significant in their comprehensibility ratings. However, the significance of sentence stress in L2 English should be tested in comparison with

other features, as the learner language system is more complicated than that of native speakers, and the relative importance of several features is not easily predicted.

3.3 Results

3.3.1 Rating Scores and Suprasegmental Measurements

Before conducting stepwise multiple regression analysis, ratings by the 10 listeners were tested for inter-rater reliability, and intraclass correlation coefficient analysis was performed for comprehensibility and foreign-accentedness rating. The intraclass correlation coefficients (average measures) were .950, and .966 for comprehensibility and foreign-accentedness, respectively (see Table 3.3); this confirms that the listeners in this research showed high agreement in their perception of learners' speech. Therefore, the values from the 10 listeners were averaged, and one comprehensibility and one foreign-accentedness score for each of the 35 Korean participants and one native speaker were yielded.

The native speaker was given 6.5 and 6.7 for comprehensibility and foreign-accentedness respectively. Although these ratings did not reach a full score of 7, 6.5, and 6.7 are high enough to conclude that the listeners' ratings were valid.

Table 3.3 *Inter-Rater Reliability: Intraclass Correlation Coefficients*

	Intraclass Correlation	95% Confidence Interval	
		Lower Bound	Upper Bound
Comprehensibility	.950	.922	.971
Foreign-Accentedness	.966	.947	.981

Next, correlation analysis was conducted between the read speech and the spontaneous speech from the same participants. This research employed the read material to control the vocabulary and grammatical aspects that might otherwise hinder native listeners from focusing on the learners' suprasegmentals. The use of read speech might have affected the learners' use of pauses and speech rate by reducing speech planning time. To verify the adequacy of the research design, therefore, correlation analysis was performed.

In foreign-accentedness ratings, the listeners showed very high agreement, with .829** correlation between read and spontaneous speech materials. In comprehensibility ratings, the listeners showed .674**, which still proves to be statistically significant and strongly correlated (see Table 3.4). In comprehensibility rating of spontaneous speech, listeners commented that the incorrect use of articles and prepositions disturbed their understanding of the speech most, and a slightly lower value may have resulted from these grammatical

errors or vocabulary choices. Finally, given all this support for the read speech material, extemporaneous speech would be more desirable, an issue that will be resolved in future research.

Table 3.4 *Comprehensibility and Foreign-Accentedness: Text Type Correlation*

		Spontaneous Speech	
		Comprehensibility	Foreign-Accentedness
Read Speech	Pearson Correlation	.674**	.829**
	N	35	35

** $p < .01$

Means of the measurements of the seven suprasegmental variables and two dependent variables from the read speech samples are presented in Table 3.5.

Table 3.5 *Descriptive Statistics of Rating Scores and Seven Measurements*

	N	*Min.*	*Max.*	*M*	*S.D*
Comprehensibility	35	2.60	6.80	5.2629	1.13632
Foreign-Accentedness	35	2.40	6.90	4.6600	1.26426
SS Appropriacy Ratio	35	.00	.69	.2440	.14145
Space	35	.02	.16	.0652	.03633
Pitch Range	35	90.00	232.00	161.5429	37.64411
N of Pauses	35	.00	11.00	3.7714	2.95143
Total Duration of Pauses	35	1.54	8.08	3.8605	1.65201
Mean Length of Run	35	3.68	13.00	7.4670	2.46991
Articulation Rate	35	220.71	389.52	305.2113	36.55999

As in previous research on comprehensibility and foreign-accentedness, the mean score for comprehensibility was rated a bit higher than that for foreign-accentedness, at 5.26 and 4.66, respectively. The correlation between the two dependent variables was very high (r =.956, p <.001).

First, the use of accurate sentence stress varied from 0% (no use of appropriate sentence stress at all) to about 70% accuracy, with a mean value of 24%. This indicates that the participants in this research generally did not make good use of sentence prominence in English. As for the space variable, the number of prominences varied by participant, from 1 prominent word to a maximum of 9 prominent words, corresponding to 2% to 16% frequency. The participants showed

great variation in pitch range. The average pitch range was about 160 Hz, with the smallest being 90 Hz, and the largest 232 Hz.

As for pauses, they ranged from 0 to 11 across participants, with total duration between 1.54 seconds and 8.08 seconds. The average number of syllables produced between pauses (MLR) ranged from 3.68 to 13. Articulation rate was on average 305, with a minimum of 220.71 and a maximum of 389.52. This means that the slowest speaker read the dialogue at 3.68 syllables per second, and the fastest speaker at 6.5 syllables per second.[25]

3.3.2 Predictors of L2 Comprehensibility and Foreign-Accentedness

First, correlation analyses between the seven independent variables and each dependent variable (comprehensibility and foreign-accentedness) were conducted; the results are seen in Table 3.6.

[25] The participants reported differing degrees of language experience, and these results are also displayed in Appendix C, based on length-of-residence characteristics. Length of residence alone will not reflect the development of each suprasegmental and fluency feature, since many learners are exposed to spoken English input without going abroad. However, it was deemed that length of residence might be the most objective basis for grouping regarding the use of spoken features.

Table 3.6 *Correlation of Suprasegmentals with Comprehensibility and Foreign-Accentedness*

Comprehensibility	*r*	Foreign-Accentedness	*r*
N of Pauses	-.727**	Articulation Rate	.730**
Articulation Rate	.726**	Mean Length of Run	.686**
Mean Length of Run	.704**	N of Pauses	-.675**
Total Duration of Pauses	-.595**	SS Appropriacy Ratio	.552**
SS Appropriacy Ratio	.566**	Space	.515**
Space	.534**	Total Duration of Pauses	-.469**
Pitch Range	.370*	Pitch Range	.363*

** $p < .01$, * $p < .05$

The comprehensibility scores of the participants were found to be best correlated with the number of pauses. In addition, two strong correlations were found between comprehensibility and two speech rate variables (articulation rate and MLR). Total duration of silent pauses, sentence stress appropriacy ratio, and space showed similarly moderate correlations with comprehensibility scores. Pitch range also proved to be significantly, positively correlated with comprehensibility.

For foreign-accentedness scores, two speech rate factors were the strongest correlates. Two pause variables showed lower *r* scores for foreign-accentedness than for comprehensibility. For both of the dependent variables, speech samples with an increased number of pauses lowered comprehensibility and strengthened

foreign-accentedness, while those with increased speech rate, frequent and appropriate use of prominence, and/or broader pitch changes were perceived as easier to comprehend, with reduced foreign-accentedness.

Stepwise multiple regression arrived at a final regression model for comprehensibility scores with three significant predictors: number of silent pauses, sentence stress appropriacy ratio, and articulation rate, as shown in the following Table 3.7.

Table 3.7 *Final Regression Model of Comprehensibility*

Variables	B	*β*	*t*-value	sig. *p*	Step Entered	R^2 Change	VIF
N of Pauses	-.145	-.377	-3.243	.003	1	.529	1.764
SS Appropriacy Ratio	2.937	.366	3.994	.000	2	.148	1.091
Articulation Rate	.012	.387	3.337	.002	3	.085	1.751
Final model R^2 = .762, F (3,31) = 33.095, p < .000, Adjusted R^2 = .739, Durbin Watson = 2.362							

The R^2 score (R^2 = .762) in the final model shows that the variables have high correlations when they are combined, and the final model explains about 76% of the variance of comprehensibility scores. In addition, the F value of 33.095 and

$p < .000$ in the final model show that the variables and the regression model are statistically significant. β values of the three variables in the final model indicate that the three variables are more or less the same in their strength of relationship to the learners' comprehensibility score. Overall, learners' speech was more comprehensible when they spoke with fewer pauses and more appropriate sentence stress within a tonality along with high speech rate.

Table 3.8 *Final Regression Model of Foreign-Accentedness*

Variables	B	β	*t*-value	sig. *p*	Step Entered	R^2 Change	VIF
Articulation Rate	.017	.489	4.158	.000	1	.532	1.718
Space	13.301	.382	4.160	.000	2	.172	1.050
Mean Length of Run	.147	.287	2.411	.022	3	.047	1.766

Final model $R^2 = .751$, $F(3,31) = 31.116$, $p < .000$, Adjusted $R^2 = .727$, Durbin Watson = 2.308

As seen in Table 3.8, unlike predictors of comprehensibility, foreign-accentedness was mainly detected by speech rate and frequency of prominence (space), which seems to reflect English rhythm characteristics. The strongest predictor, entered first, was articulation rate, followed by space and MLR. With these variables in the final model, about 75% of the variance can be explained. β

values for the three variables indicate that articulation rate is most strongly related to the dependent variable, followed by space and MLR.

3.4 Summary and Discussion

In this chapter, L2 English speech was examined in order to clarify the importance for comprehensibility of sentence stress appropriacy relative to that of other factors such as speech rate and pause use. Consistent with the findings of previous research (Munro & Derwing 1995a; 1999, among others), native listeners scored (the same) individual speakers slightly higher on comprehensibility than foreign-accentedness. This means that listeners perceive the same speech differently in terms of comprehensibility than of foreign-accentedness: L2 speech with a foreign accent may also potentially be comprehended without handicap. This suggests that the ultimate goal of pronunciation teaching should not be to remove the foreign accent itself, but to improve comprehensibility (Munro & Derwing, 1995). This study follows previous research on the relative contribution of several components of learner speech (e.g., Kang, 2010; Trofimovich & Isaacs, 2012), but with more focus on sentence stress appropriacy. The final regression results show that pause frequency, speech rate, and sentence stress appropriacy contributed critically to

comprehensibility ratings, while speech rate and prominence frequency did so for foreign-accentedness.

Comprehensibility was best predicted when three variables combined: the number of pauses within a tonality, sentence stress appropriacy, and articulation rate. This confirms the significant contribution of pause and speech rate to L2 speech comprehensibility, as also identified in previous research. What is important here is that the appropriate use of sentence stress also proved to be a significant predictor of comprehensibility. Sentence stress appropriacy has long been regarded as an important factor in L2 pronunciation research. Jenkins (2002) reported that communication breakdown was caused when L2 speakers misused sentence stress in communication with other non-native speakers. Further, she considered sentence stress to be the only core suprasegmental feature that learners in the English as an International Language (EIL) context should acquire. Hahn (2004) similarly claimed that the appropriate use of English sentence stress facilitates native listeners' processing of information. These research studies provided support for the assertion of the importance of English sentence stress in L2 English speech comprehensibility, without making any statement regarding its relative importance compared to other aspects of L2 prosody. It was thus unclear if it had made a comparable contribution to L2 speech comprehensibility as speech rate and pause did. In the Communicative Language Teaching (CLT) approach and

lingua franca core, it is very important to differentiate significant comprehensibility factors from those that merely contribute to foreign-accentedness. If speech rate and pause overrode the effect of sentence stress, it would be difficult to claim that sentence stress should receive greater attention in the EFL context. In the present research, however, it has been shown that sentence stress still significantly contributes to L2 speech comprehensibility. Further, given that what was counted was the number of pauses within a tonality, it has been proved partly or indirectly here that both tonality and tonicity (that is, sentence stress appropriacy) significantly contribute to L2 speech comprehensibility. This is because sentence stress affects the natural pause distribution of an utterance. Pauses tend to attract the listener's attention when they are placed before or after new information. Too many pauses within a tonality and before given information disturbs the comprehension of L2 speech (Hahn & Dickerson, 1999). Future research with a more refined methodology may shed some new light on the relationship between pause and L2 speech comprehensibility, if pause occurrences can be examined in relation to givenness.

As for foreign-accentedness, three variables—articulation rate, space, and mean length of run—were ultimately left in the regression model as best predictors of the Korean EFL learners' pronunciation. In calculating the space variable, the appropriacy of the prominence position was not considered. This implies that the

use of prominence itself with a moderate speech rate enables learners to remove foreign-accentedness. However, removing foreign-accentedness is not a crucial objective in either CLT or EIL. Although speech rate is still important in making L2 speech comprehensible, learners may be encouraged to become more engaged in trying to use sentence stress appropriately, focusing on the information structure of their utterance. With regard to given and new information, Clark and Haviland (1977, p. 4) added one more principle to Grice's Maxims (Grice, 1975).

Maxim of antecedence: *Try to construct your utterance such that the listener has one and only direct antecedent for any given information and that it is the intended antecedent.*

Concerning the relationship between the maxim of antecedence and sentence stress, Baumann (2006) explains that the assumption shared by interlocutors is that they will cooperate/are cooperating in making communication more efficient, thus resulting in making their own utterance more easily understood. Adherence to this maxim facilitates the processing of utterances. Of more importance, using appropriate sentence stress based on the given or new status of linguistic items helps the speaker construct coherent discourse, thus

reducing efforts from the listener (Baumann, 2010). Fuchs (1984) further states the following.

Hearers know what is 'given' in discourse and what is not; in fact, have to know it, to be able to competently participate: recent work has impressively shown how interactants constantly have to draw on their fund of common knowledge, in general and as regards the givens of the situation at hand, to be able to adequately produce and correctly interpret utterances. This kind of knowledge is a prerequisite to communication rather than something itself communicated. (Fuchs, 1984, p. 143; underline added)

It has been proved that sentence stress has significant communicative value (Hahn, 2004; Jenkins, 2002). The results of the present study showed that the effect of sentence stress was not negligible when compared with those of speech rate and pause. Thus, sentence stress needs to be taught more assiduously now in the language classroom than previously, but little consideration is currently given to it in L2 pronunciation materials. Currently, teaching intonation at the sentence level focuses on intonation contours related to sentence types, or linking (Park & Son, 2013). Baker (2010) also points out, citing Celik (2005), that "[n]on-native

speakers of English must learn this complex system largely implicitly, as very little ESL instruction targets discourse-level accentuation (p. 21)."

It should be kept foremost in mind in foreign language education that the production and perception of an L2, especially of spoken language, take place to convey and understand information. However, not much research deals with learners' pronunciation at the discourse level through the lens of communication. More systematic and comprehensive research, including on the informational aspect at the discourse level, should be conducted.

Given that the goal of English teaching is generally to improve learners' communicative language ability, it is fundamental for learners to be aware of the importance of sentence stress and information structure in the communicative context. Even advanced learners might face communication breakdown due to lack of awareness of the communicative functions of sentence stress. As mentioned in chapter 2, the use of English sentence stress requires discourse-level knowledge as well as phonetic and phonological knowledge in English. In addition, the realization of Korean givenness does not necessarily depend on prosodic variation, since Korean employs morphological and syntactic mechanisms for this purpose. This may hinder Korean-speakers from perceiving the function of English sentence stress in communicative discourse. To address this, it will be helpful to instruct Korean learners on the notion of information structure and its

functions. In addition, learners should be informed at an early stage of English learning that the information structure of an utterance is reflected in prosody in English.

Focusing more on sentence stress in the classroom will benefit learners in terms of listening as well as speaking, since using appropriate sentence stress also provides information on what the listener should really focus on. In English classrooms at present, it is often assumed that learners have difficulty with L2 English listening because they are not familiar with the features of the spoken language, especially such features as reduced sounds, linking, etc. However, if learners are instructed to focus on the way information structure is prosodically structured, their English listening ability can be aided and improved. This is because learners may have a more limited capacity to process an L2 than an L1, and it may be more efficient for them to focus on more informative parts. If learners' attention is drawn instead to features like reduced sounds or linking, they may overlook the more important aspects of the spoken language, such as sentence stress on new information, due to limited processing capacity. In short, current approaches to listening that focus on reduced forms might interfere with learners' ability to concentrate on what really needs to be focused on. I believe that the reduction of unaccented elements need not be the primary concern in the EFL

context; instead, there should be more emphasis on sentence stress placement in L2 pronunciation teaching.

This also seems to reflect the natural process of prosody planning: According to Baumann (2006), nuclear accent is considered foremost ("planned first," p. 64) in an utterance, and this ultimately determines the rhythm of the utterance. For example, the prenuclear accent is sometimes placed in subject position, which is preferred by the rhythm. However, this placement of the prenuclear accent is subsidiary to placement of the nuclear accent. This can also be applied to the vowel reduction or stress-timing of L2 speech—what determines English rhythm and stress-timing is the placement of sentence stress, not the reduction in vowel duration itself. Further, keeping stress-timing itself is not critical in the EIL context (Jenkins, 2002). Moreover, the appropriate use of English sentence stress will benefit learners in terms of language fluency, in that sentence stress production is one of the key factors determining pronunciation fluency (Ahn, 2008).

CHAPTER 4 SENTENCE STRESS PRODUCTION BY KOREAN LEARNERS

This chapter reports the results from the experiment on the acoustic correlates in English sentence stress production by Korean learners. The purpose of this experiment is to reveal the overall characteristics of Korean learners' production of sentence stress. Section 4.1 describes the methodology of the experiment. Section 4.2 introduces hypotheses about the research question. Section 4.3 shows the results. Finally, section 4.4 discusses the results and concludes the chapter.

4.1 Methodology

In the previous chapter, it was shown that sentence stress is a significant predictor of L2 speech comprehensibility, along with pause use and speech rate factors. Despite its essential role in speech comprehension, little attention has been paid to its instruction in the L2 context (Baker, 2010). To implement an effective teaching methodology, the production of English sentence stress by Korean learners needs to be examined. This experiment attempts to explore the difficulties Korean learners experience during the production of English sentence stress. In the

experiment, the participants were provided with short paragraphs and dialogues in which the context determined the placement of sentence stress. The acoustic analysis of Korean speakers' production is expected to reveal how correctly Korean learners place the sentence stress on specific words as well as how accurately they employ acoustic cues.

4.1.1 Speakers

Thirty-nine Korean speakers participated. They were enrolled at a university in Seoul as undergraduate or graduate students at the time of recording. One English native speaker who was born and raised in Canada was also included for the purpose of comparison. All of them were female students. This was to avoid gender-related confounding variables in speech analysis. They were asked to read short English monologues and dialogues.

A male native speaker participated as an interlocutor for the dialogue reading. He was born and raised in Florida, U.S., and was 25 years old at the time of recording.

The Korean participants were grouped based on the length of their exposure to English in an ESL context. The participants differed in their Age of Arrival (AOA), but the number of participants for each range of AOA (e.g., early or late)

was not sufficient to make subdivisions for statistical analyses. Therefore, only Length of Residence (LOR) was considered in forming groups. Table 4.1 indicates the number of participants for each group and their information on language experience.

Table 4.1 *Participant Information for Experiment 2*

Group	Length of Residence	Age (*S.D*)	Age of Arrival	*N*
Long Residence	8 ~ 19 years	24 (5.7)	0[26] ~ 18	9
Experienced	1.5 months ~ 2 years	27 (6.3)	5 ~ 38	12
Inexperienced	none	22 (1.8)		18
Total				39

Nine participants who had stayed in an English speaking country for eight or more years (up to 19 years of stay) formed the first group, the Long Residence Group. They varied in their age of arrival in the country. Six of them started learning English in an ESL context before the age of seven, and most of them are considered (by themselves or others) native or near native speakers. Three of them were late learners of English, having arrived in the country between the ages of 11 to 18. Next, the Experienced Group comprised 12 participants who had short to

[26] AOA 0 ~ 18 includes one participant of age 0 from the Northern Mariana Islands, who is Korean–English bilingual.

medium lengths of residence in English speaking countries (one and a half months to two years); these were mostly late learners. Finally, 18 participants with no exposure to English in an ESL context formed the Inexperienced Group.

4.1.2 Recordings and Measurements

Recording was conducted in a soundproof facility using a SONY PCM-M10 recorder with a built-in microphone. The participants were given some sheets of paper containing monologues and dialogues. Glossaries were given for the pronunciation of some unfamiliar words, and they were allowed to ask the researcher when there were other unfamiliar words during the recordings. They were asked to read the materials as naturally as possible.

The material recorded contained various types of sentences, not limiting the sentence type to the answers to *wh*-questions. The dialogues included contextually determined given and new information, which can naturally elicit the production of sentence stress depending on the information structure. The materials for this experiment came from Hahn and Dickerson (1999).[27]

Acoustic analyses of the production of English sentence stress were conducted both syntagmatically and paradigmatically. In a syntagmatic analysis, a

[27] See Appendix D for the monologues and dialogues used.

word with prominence is compared with the preceding or following word. Therefore, the stressed vowels to be measured were not controlled as the same vowel category. In this case, the inherent vowel duration can affect the measurements. On the other hand, in a paradigmatic analysis, the same word is compared in terms of its newness/givenness. Therefore, the measurements were conducted for the same vowel.

For syntagmatic observation, the duration, mean f0, and mean intensity of the lexically stressed vowels of the sentence stress (accent) and pre-sentence stress (pre-accent) words were first measured. Then, the ratios of the pre-accent word to the accented word were calculated for each acoustic measure from each speaker. For example, in the sentence, *You find the key syllable after you determine the rule*, the function word *after* has a contrastive focus (narrow focus) in the given context, and thus should be pronounced with more prominence than the other surrounding words such as *syllable* or *you*. Measurements were conducted on the lexically stressed vowels of *syllable* and *after*. Then the ratios of the duration, f0, and intensity measures from the first vowel of *syllable* to the first vowel of *after* were calculated. A lower ratio means larger differences between pre-accent and accented words. For example, a ratio of 0.7 means that pre-accent and accent show a 30% difference in acoustic measure, where the accented word is pronounced 30% longer/higher/louder than the pre-accent word.

Mo (2010) compared syntagmatic and paradigmatic normalization in the perception of English prominence by native speakers, and the results showed that syntagmatic normalization better predicted the native listeners' perception. It also turned out that the duration cue was most stable in the prominence perception regardless of its normalization (raw, syntagmatic, and paradigmatic), as well as the syntagmatically normalized intensity cue.

The material included both content and function words, which were either in broad or narrow focus. This resulted in a total of 309 ratios of each acoustic measure (39 speakers x 2 item pairs x 4 conditions, which was expected to create 312 ratios, but there were three missing values). Further, for a positional comparison (pre-accent and post-accent), additional two-word pairs were included only for content words in narrow focus. Kügler (2008) reported that in German, the word duration change for given information is not consistent across the position. His data showed that the given information words were indeed shortened in the pre-focal position. However, the change was not attested in the post-focal position. Moreover, in some cases, given information words in the post-focal position were even lengthened. It would be more desirable to consider pre-accent and post-accent items for all categories and within the same sentence, but the present study contained only two cases of content words in narrow focus due to

the problem of data collection. Future research could solve this problem. Table 4.2 below shows the word pairs measured in the syntagmatic observation.

Table 4.2 *Target Words for Syntagmatic Measurements*

Focus Type	Word Type	accent	pre-/post-accent
Broad focus	Content	*used*	*never* (pre)
		new	*some* (pre)
	Function	*on*	*you* (pre)
		in	*been* (pre)
Narrow focus	Content	*used*	*any* (pre)
		few	*have* (pre)
	Function	*after*	*syllable* (pre)
		above	*look* (pre)
	Content	*physics*	*major* (post)
		nuclear	*physics* (post)

The classification of content and function words followed that in Hahn and Dickerson (1999). The distinction between broad and narrow focus was made according to the following criteria. Broad focus was defined as consisting of two or more new information words without any contrasting word in the previous context. On the other hand, if the focus contained only one new information word

or if there was a contrasting word in the earlier utterance, it was considered narrow focus.

For paradigmatic observation, words mentioned twice were compared; namely, the first one had sentence stress, and the second one did not. Measurements were conducted for duration, mean f0, and mean intensity of the lexically stressed vowel of each word. The words included in the paradigmatic examination were *computer*, *carbohydrates*, and *century*.

Vowel duration was measured from the onset to offset of the second formant. Mean f0 and intensity were measured for the same vowel interval. The measurements were conducted by using Praat speech analysis software (version 5.3.82) using Praat scripts in Kyuchul Yoon's Praat Script Archive[28] with some modifications, and the measurement conditions were set at default for all three acoustic cues.

4.2 Predictions

As described in Chapter 2, Korean learners are known to have difficulty placing English sentence stress in the appropriate place and to properly manipulate

[28] Retrieved on September, 2014 from the Kyuchul Yoon's Praat Script Archive: http://www.ling.ohio-state.edu//~kyoon/praat.

acoustic cues to signal sentence stress compared to native speakers of English (Um et al, 2001, among others). In this experiment, a total of 39 participants were examined on 13 utterances for their use of acoustic cues to signal sentence prominence. Three predictions were made on the basis of the research question.

(1) Korean learners will have more difficulty placing English sentence stress in broad focus than in narrow focus.

The accentuation in narrow focus is rather simple and straightforward (Ladd, 1996). Further, it has been partly shown that both Korean and English show manipulation of f0, duration, and intensity (Jun & Lee, 1998; Lee & Xu, 2010). In contrast, broad focus requires the application of an English specific rule, which is rarely taught in L2 instruction.

(2) Korean learners will have more difficulty placing sentence stress on function words than on content words.

In stress-timing, attenuation of function words is a key factor at the sentence level, where every word has a new status (Celce-Murcia, 1996). In instructing English rhythm, function words are usually considered to be reduced in most of

the contexts because materials at the discourse level are rarely chosen. For this reason, learners might not be aware of the fact that function words need to be accented in some contexts.

(3) Korean learners will show different ways of using acoustic cues to signal prominence.

They may more easily manipulate f0 than duration or intensity cues, as shown in previous research (Kim, 2007, among others).

4.3 Results

4.3.1 Syntagmatic Observation

First, changes in acoustic cues across the three groups are presented regardless of the focus type to show overall differences among the three groups. Then, the results on focus type and focus type combined with word type will be discussed in more detail.

4.3.1.1 Comparing the Three Groups

Figure 4.1 shows the acoustic changes averaged for each group. The participants differently adjusted the three acoustic cues. The results show that the participants used vowel duration differences more than f0 and intensity.

The native speaker (NS) on average lengthened the duration of the accented vowels by 41%, while f0 and intensity were lowered very little for the accented words. It was shown that the accented and non-accented elements (when the same words appeared in two different positions) had 30 to 40% word duration difference (Cooper et al., 1985; Eady & Cooper, 1986), and it seems that the difference is maintained for vowel duration and for syntagmatic observation.

The Long Residence Group changed vowel duration (36%) as much as the native speaker did (41%). It is not surprising that six of the members of the Long Residence Group were early arrivals who were mostly considered native or near native speakers. The vowel duration ratios of the Experienced and Inexperienced Groups showed changes of 23% to 20%, which are lower than those of the native speaker and Long Residence Group. However, it is not clear, at this point, whether the Experienced and Inexperienced Groups lengthened the vowels for sentence prominence or whether the changes derived from the inherent vowel length difference, as the vowels were not controlled in syntagmatic observation.

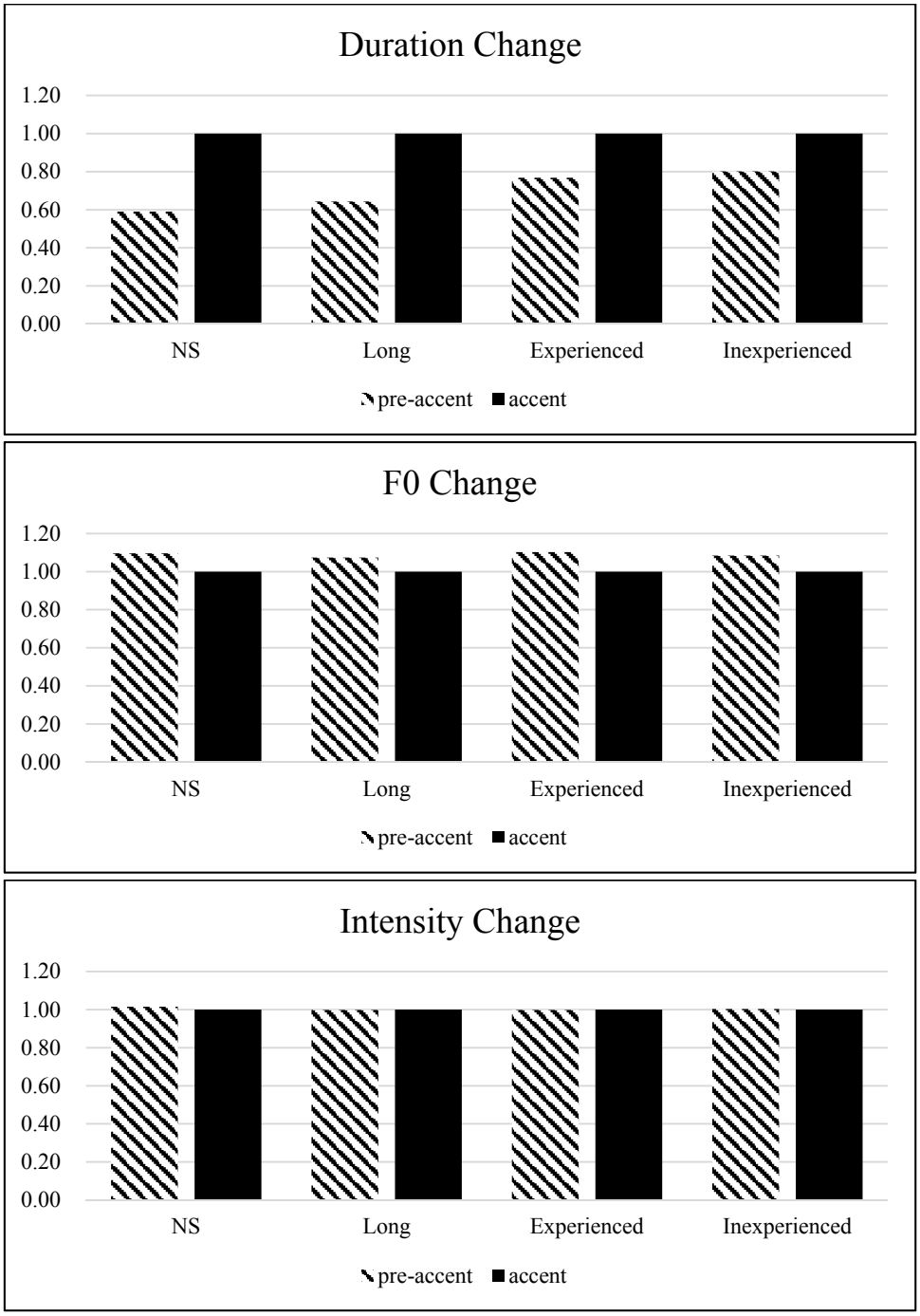

Figure 4.1 Changes in Acoustic Cues by the Three Groups

The three groups showed a similar tendency in f0 change. They generally lowered the f0 of accented words. The difference was slight, and this can be interpreted, at this moment, as indicating that the participants did not substantially change vowel pitch to signal sentence prominence in the phonological context used for this research. The difference might have resulted from the natural declination of pitch since the eight cases compared here were in pre-accent to accent transition. The results of the analysis of f0 and intensity pattern will become clearer by comparison with post-accent items, which will be dealt with in section 4.3.1.4.

The three groups slightly changed the vowel intensity to mark the focus. The Long and Experienced Groups made positive changes in intensity, while the Inexperienced Group made negative changes, but the amount of change was not readily noticeable.

The descriptive statistics from the three groups are presented in Table 4.3. The ratios of the measurements of the eight cases from each subject were first averaged, and then the means for each group were produced.

Table 4.4 shows the statistical results of a one-way ANOVA for the group differences. The results show that the difference among the three groups was proved to be significant only for the duration difference (F=3.571, p=.038).

Table 4.3 *Descriptive Statistics of the Ratios of Measures of Duration, F0, and Intensity as a Function of Length of Residence*

		Duration Ratio		F0 Ratio		Intensity Ratio	
Group	*N*	*M*	*S.D*	*M*	*S.D*	*M*	*S.D*
Long	9	.6438	.07419	1.0739	.04538	.9985	.01219
Experienced	12	.7678	.09845	1.1028	.12448	.9981	.02400
Inexperienced	18	.8017	.19073	1.0845	.09536	1.0035	.01705
Total	39	.7548	.15574	1.0877	.09544	1.0007	.01830

Table 4.4 *One-way ANOVA Results of the Group Difference as a Function of Length of Residence*

		Sum of Squares	df	F	Sig.
duration	Between Groups	.153	2	3.571	.038
	Within Groups	.769	36		
	Total	.922	38		
f0	Between Groups	.005	2	.244	.785
	Within Groups	.342	36		
	Total	.346	38		
intensity	Between Groups	.000	2	.379	.687
	Within Groups	.012	36		
	Total	.013	38		

Table 4.5 shows pairwise comparison results. The homogeneity of variances assumption was not met, so the Games-Howell test was used. The results indicate that the difference between the Long Residence Group and the Experienced Group (p=.010), and the difference between the Long Residence Group and the Inexperienced Group (p=.014) significantly contributed to the group difference. The Experienced and Inexperienced Groups did not differ from each other significantly (p=.801). These results suggest that the duration change for sentence level accentuation is difficult for Korean learners to acquire after a long period of English learning in an EFL context.

Table 4.5 *Post-hoc Comparison Results of the Duration Ratio by the Three Groups*

Dependent Variable	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
duration Games-Howell	Long	Exp.	-.12403*	.03767	.010	-.2197	-.0283
		Inexp.	-.15793*	.05131	.014	-.2860	-.0299
	Exp.	Long	.12403*	.03767	.010	.0283	.2197
		Inexp.	-.03391	.05319	.801	-.1659	.0980
	Inexp.	Long	.15793*	.05131	.014	.0299	.2860
		Exp.	.03391	.05319	.801	-.0980	.1659

*. The mean difference is significant at the 0.05 level.

4.3.1.2 Focus Type

In this section, the changes in acoustic cues are presented for each focus type. Figures 4.2 to 4.4 show a distinctive tendency among the three groups for broad and narrow focus, respectively, for the three acoustic measures.

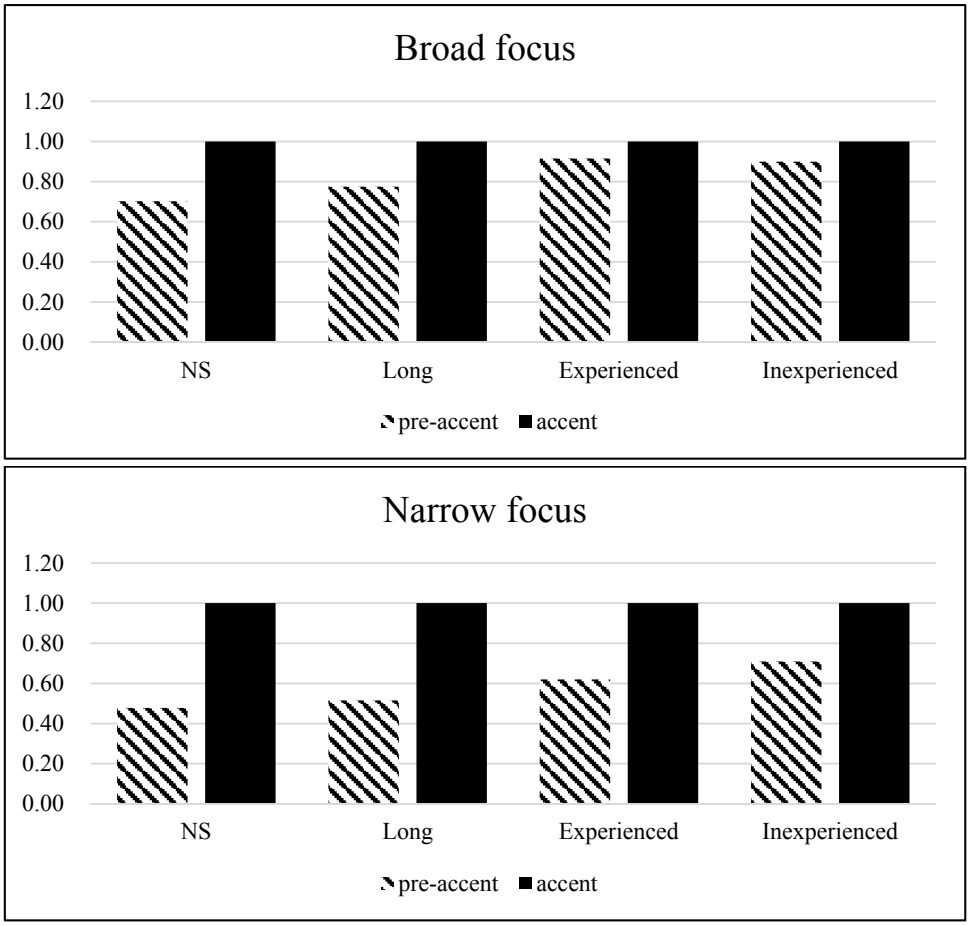

Figure 4.2 Duration Difference between Pre-accent and Accent

As shown in Figure 4.2, the Long Residence Group manifested a relatively substantial vowel duration difference for both broad and narrow focus (22% for broad focus, 48% for narrow focus), but these were lower than those of the native speaker (30% for broad focus, 52% for narrow focus). The Experienced Group did not change the vowel duration much for the prominent syllable in broad focus (8%). The same was true for the Inexperienced Group (10%). However, these two groups showed substantial changes in vowel duration in narrow focus (38% and 29%, respectively), although the changes were not as great as those observed for the native speaker (52%) and the Long Residence Group (48%). The results indicate that Korean learners vary vowel duration more readily in narrow focus than in broad focus.

Figure 4.3 shows the f0 change for sentence prominence in broad and narrow focus. On the whole, the Experienced Group alone deviated from the native speaker and the other two groups for both focus types. They lowered their vowel pitch for the narrow focus a lot, while keeping the pitch for the targets in broad focus.

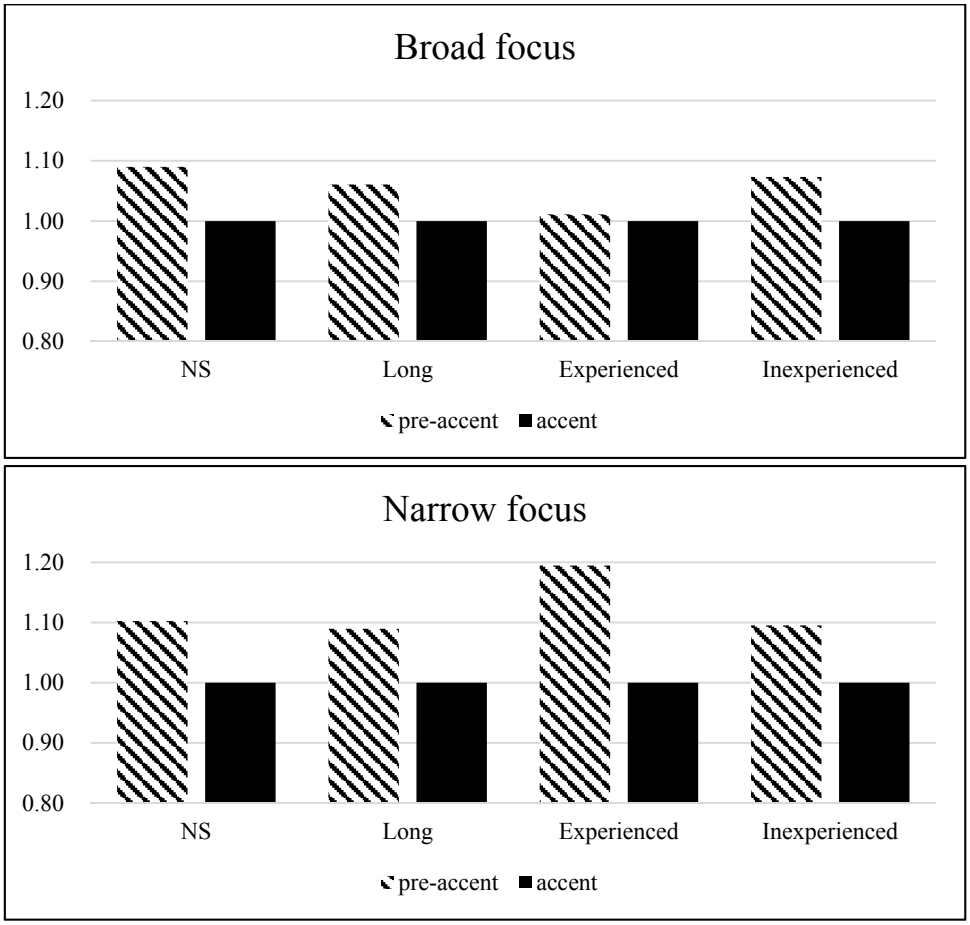

Figure 4.3 F0 Difference between Pre-accent and Accent

When the vowel duration and f0 patterns are combined, the results show that the Experienced Group did not make sufficient changes in vowel duration. Instead, they maintained vowel pitch for the accented words in broad focus. It appeared that declination was delayed when we compared it with the pitch height of the other two groups. On the other hand, the same participants made sufficient duration changes for narrow focus, substantially lowering the vowel height.

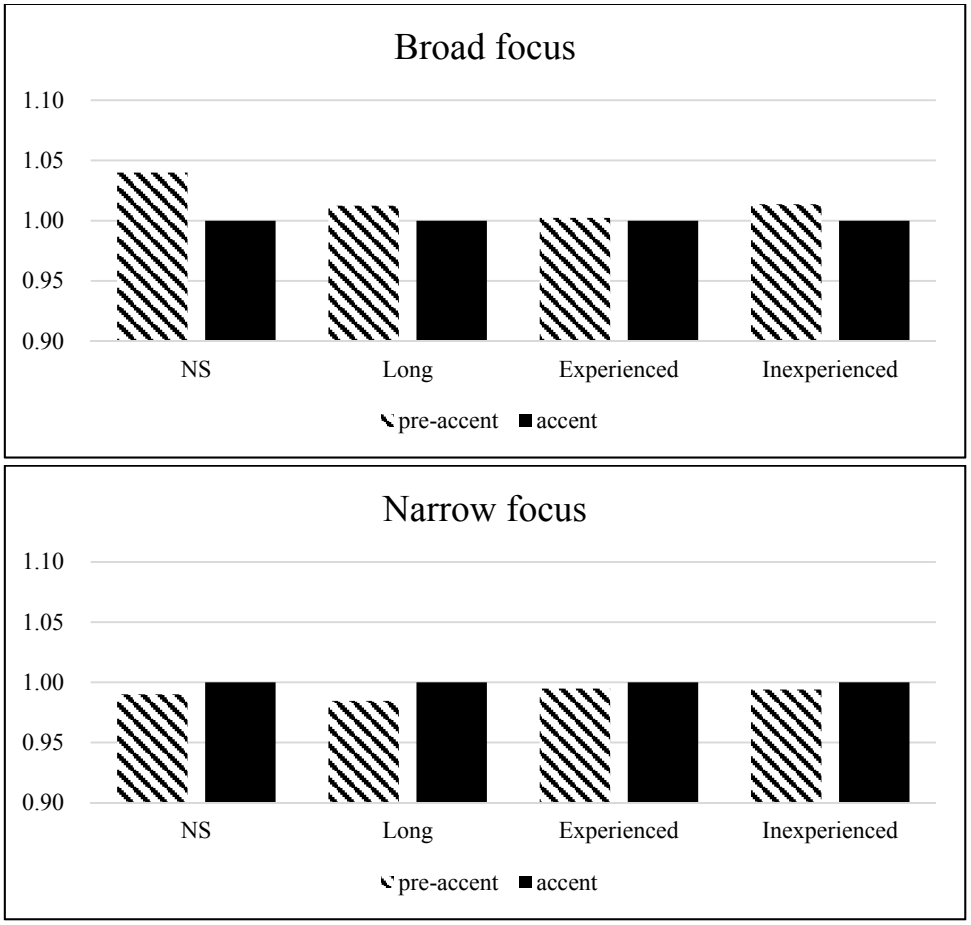

Figure 4.4 Intensity Difference between Pre-accent and Accent

Figure 4.4 shows the intensity characteristics of the stressed syllable in broad and narrow focus. As for the intensity change from the pre-accent to accent words, the differences were very slight, but the three groups did differ in the degrees of the changes of intensity. They generally weakened the amplitude of the

words in broad focus, while strengthening the intensity of the words in narrow focus.

Table 4.6 shows the descriptive statistics of the three measures according to the group and focus type.

Table 4.6 *Descriptive Statistics of the Ratios of Measures of Duration, F0, and Intensity as a Function of Focus Type and Length of Residence*

		Broad focus					
		Duration		F0		Intensity	
Group	*N*	*M*	*S.D*	*M*	*S.D*	*M*	*S.D*
Long	9	.7752	.12221	1.0607	.08256	1.0124	.01842
Experienced	12	.9156	.15046	1.0110	.08260	1.0023	.02837
Inexperienced	18	.8996	.23010	1.0731	.09588	1.0136	.02689
Total	39	.8758	.19118	1.0512	.09100	1.0099	.02558
		Narrow focus					
		Duration		F0		Intensity	
Group	*N*	*M*	*S.D*	*M*	*S.D*	*M*	*S.D*
Long	9	.5150	.05235	1.0897	.10465	.9850	.02229
Experienced	12	.6200	.12796	1.1946	.27460	.9940	.03483
Inexperienced	18	.7094	.20020	1.0954	.15622	.9936	.02394
Total	39	.6371	.17132	1.1246	.19310	.9917	.02695

Table 4.6 indicates that, overall, larger standard deviations were observed in broad focus than in narrow focus for duration changes. This implies that the duration cues were more stably employed for sentence prominence with narrow focus. Also, the Long Residence Group made more consistent changes in duration than the Experienced Group, and the Experienced Group did so more than the Inexperienced Group. However, the standard deviations for the f0 changes appeared to be larger in narrow focus than in broad focus. The standard deviations of f0 did not much differ across focus type for the Long Residence Group, but the other two groups showed larger standard deviations in narrow focus than in broad focus. This suggests that some of the participants in the two groups, especially the Experienced Group, produced the accented vowel with noticeable pitch difference. As for intensity change, the individual difference was not big, either across the groups or between focus types.

To examine the group difference in more detail, a one-way ANOVA was conducted for each focus type. Table 4.7 shows the results.

Table 4.7 *One-way ANOVA Results of the Group Difference for Broad Focus*

		Sum of Squares	df	F	Sig.
duration	Between Groups	.120	2	1.708	.196
	Within Groups	1.269	36		
	Total	1.389	38		
f0	Between Groups	.029	2	1.816	.177
	Within Groups	.286	36		
	Total	.315	38		
intensity	Between Groups	.001	2	.754	.478
	Within Groups	.024	36		
	Total	.025	38		

As shown in Table 4.7, the difference among the three groups for the three measures was not significant. It seems that the large standard deviation for the duration ratio in the three groups resulted in insignificance. Table 4.8 shows the ANOVA results for narrow focus.

Table 4.8 *One-way ANOVA Results of the Group Difference for Narrow Focus*

		Sum of Squares	df	F	Sig.
duration	Between Groups	.232	2	4.725	.015
	Within Groups	.883	36		
	Total	1.115	38		
f0	Between Groups	.085	2	1.149	.328
	Within Groups	1.332	36		
	Total	1.417	38		
intensity	Between Groups	.001	2	.353	.705
	Within Groups	.027	36		
	Total	.028	38		

The duration ratio difference among the three groups turned out to be significant (F=4.725, p=.015). Table 4.9 shows the post-hoc comparison of the three groups, and indicates that the Long Residence Group made significantly more vowel duration change for narrow focus words than the Inexperienced Group (p=.016). The difference between the Long Residence Group and the Experienced Group and the difference between the Experienced and Inexperienced Groups were not statistically meaningful.

Table 4.9 *Post-hoc Comparison Results of the Duration Ratio by the Three Groups*

Dependent Variable				Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
duration	Scheffe	Long	Exp.	-.10500	.06908	.326	-.2814	.0714
			Inexp.	-.19444*	.06395	.016	-.3577	-.0312
		Exp.	Long	.10500	.06908	.326	-.0714	.2814
			Inexp.	-.08944	.05838	.321	-.2385	.0596
		Inexp.	Long	.19444*	.06395	.016	.0312	.3577
			Exp.	.08944	.05838	.321	-.0596	.2385

Table 4.10 shows the results from a repeated measures ANOVA with focus type (within subject variable) and the three groups (between subject variable), with the results of the interaction between focus type and the three groups. The interaction pattern between focus type and group was observed in terms of the f0 cues, as shown in Figure 4.5, but it did not reach significance. The results revealed that there was a significant effect of focus type on the duration (F=63.535, p=.000), f0 (F=4.397, p=.043) and intensity (F=9.111, p=.005) changes as a whole.

Table 4.10 *Repeated Measures ANOVA Results as a Function of Focus Type and Length of Residence*

Source		Type III Sum of Squares	df	F	Sig.
focus	duration	2.254	1	63.535	.000
	f0	.228	1	4.397	.043
	intensity	.014	1	9.111	.005
focus * Group	duration	.081	2	1.135	.333
	f0	.206	2	1.989	.152
	intensity	.002	2	.770	.471
Error(focus)	duration	1.277	36		
	f0	1.868	36		
	intensity	.054	36		

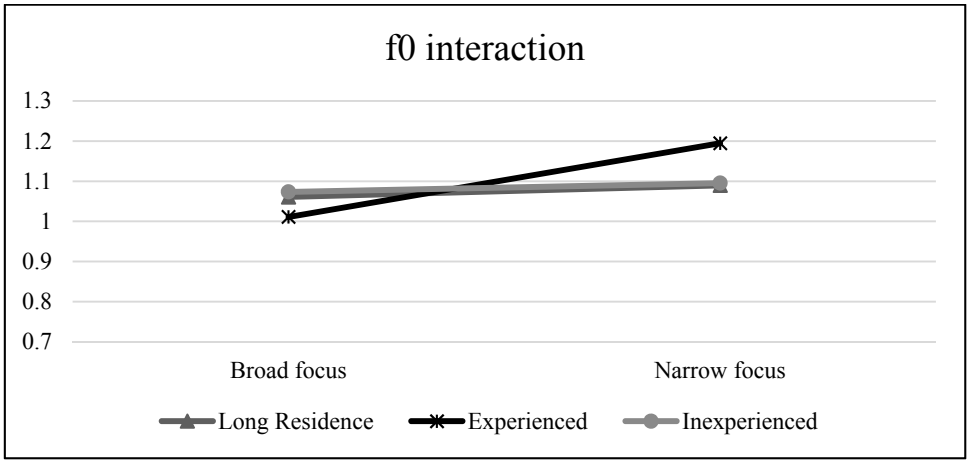

Figure 4.5 F0 Interaction between Focus Type and Group

4.3.1.3 Focus Type X Word Type

In this section, the results on broad focus and narrow focus are presented in combination with the word type to examine whether the participants behaved differently depending on the word type for each focus type. Table 4.11 shows the descriptive statistics of the three measures for each focus type.

Table 4.11 *Descriptive Statistics of the Ratios of Measures of Duration, F0, and Intensity as a Function of Focus Type, Word Type, and Length of Residence*

		Duration								
		Long	*S.D*	*Exp.*	*S.D*	*Inexp.*	*S.D*	*Total*	*S.D*	*(NS)*
broad	content	0.69	0.20	0.63	0.14	0.76	0.25	0.70	0.21	0.54
	function	0.86	0.11	1.20	0.31	1.04	0.27	1.05	0.28	0.87
narrow	content	0.56	0.11	0.60	0.16	0.75	0.25	0.66	0.21	0.55
	function	0.47	0.09	0.64	0.19	0.67	0.29	0.61	0.24	0.41
		F0								
		Long	*S.D*	*Exp.*	*S.D*	*Inexp.*	*S.D*	*Total*	*S.D*	*(NS)*
broad	content	1.05	0.14	1.00	0.10	1.07	0.10	1.05	0.11	1.06
	function	1.06	0.09	1.02	0.10	1.08	0.14	1.05	0.12	1.12
narrow	content	1.19	0.20	1.21	0.22	1.10	0.15	1.15	0.19	1.16
	function	0.99	0.28	1.18	0.54	1.09	0.22	1.10	0.36	1.05

		Intensity								
		Long	*S.D*	*Exp.*	*S.D*	*Inexp.*	*S.D*	*Total*	*S.D*	*(NS)*
broad	content	0.99	0.03	0.97	0.03	1.00	0.05	0.99	0.04	1.00
	function	1.03	0.03	1.03	0.04	1.03	0.06	1.03	0.05	1.09
narrow	content	0.99	0.03	0.99	0.04	0.99	0.04	0.99	0.04	0.99
	function	0.98	0.05	1.00	0.04	1.00	0.04	0.99	0.04	0.99

More complicated patterns were observed for broad focus than for narrow focus. For content words in broad focus, the three groups did not show a big discrepancy from each other. However, the Experienced Group exhibited a peculiar pattern when the function words were in broad focus and needed to be accented. They shortened the vowel of accented function words, instead of lengthening it. The Inexperienced Group did not make a noticeable change at all for the function words in broad focus.

As for the f0 cues, the observation indicated that the three groups and the native speaker showed no remarkable feature. Also for the intensity change, during the transition from pre-accent to accented words, they did not make significant changes.

There are, however, three noteworthy features in the standard deviations of the ratios. First, generally, the Inexperienced Group showed consistently large standard deviations for duration changes in all four types, which implies the

existence of noticeable individual differences; the participants in the group variably changed the duration. It seems that their knowledge of sentence stress placement is not stable. Second, the Experienced Group showed the largest standard deviations for vowel duration of the function words in broad focus. This shows that the difference among the participants in the group is not negligible, and the feature is not readily learned. Third, the Experienced Group again showed the greatest standard deviation in the f0 cues for function words in narrow focus. This implies that the degree of the f0 cue change is greatly variable depending on the speakers. This reveals that function words are problematic for the learners in both broad and narrow focus.

To examine whether the difference among the three groups was significant, a one-way ANOVA was conducted for each combination of focus type and word type for each acoustic measure. The results indicate that the group differences are significant only for the following two types: 1) duration changes for function words in broad focus shown in Table 4.12 (F=4.487, p=.018), and 2) duration changes for content words in narrow focus as indicated in Table 4.13 (F=3.654, p=.036).

Table 4.12 *One-way ANOVA Results of the Group Difference as a Function of Word Type for Broad Focus*

				Sum of Squares	df	F	Sig.
Broad	content	duration	Between Groups	.136	2	1.578	.220
			Within Groups	1.550	36		
			Total	1.685	38		
		f0	Between Groups	.031	2	1.268	.294
			Within Groups	.437	36		
			Total	.468	38		
		intensity	Between Groups	.006	2	1.814	.178
			Within Groups	.060	36		
			Total	.066	38		
	function	duration	Between Groups	.604	2	4.487	.018
			Within Groups	2.422	36		
			Total	3.025	38		
		f0	Between Groups	.025	2	.881	.423
			Within Groups	.507	36		
			Total	.532	38		
		intensity	Between Groups	.000	2	.025	.975
			Within Groups	.080	36		
			Total	.081	38		

Table 4.13 *One-way ANOVA Results of the Group Difference as a Function of Word Type for Narrow Focus*

				Sum of Squares	df	F	Sig.
narrow	content	duration	Between Groups	.284	2	3.654	.036
			Within Groups	1.398	36		
			Total	1.681	38		
		f0	Between Groups	.095	2	1.407	.258
			Within Groups	1.211	36		
			Total	1.305	38		
		intensity	Between Groups	.000	2	.043	.958
			Within Groups	.057	36		
			Total	.057	38		
	function	duration	Between Groups	.253	2	2.410	.104
			Within Groups	1.889	36		
			Total	2.142	38		
		f0	Between Groups	.188	2	.729	.489
			Within Groups	4.646	36		
			Total	4.834	38		
		intensity	Between Groups	.002	2	.671	.518
			Within Groups	.066	36		
			Total	.068	38		

Table 4.14 *Post-hoc Comparison Results of the Duration Ratio by the Three Groups*

Dependent Variable				Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
broad X function	Games-Howell	Long	Exp.	-.34194*	.09713	.009	-.5957	-.0881
			Inexp.	-.18000	.07319	.054	-.3627	.0027
		Exp.	Long	.34194*	.09713	.009	.0881	.5957
			Inexp.	.16194	.11073	.328	-.1168	.4407
		Inexp.	Long	.18000	.07319	.054	-.0027	.3627
			Exp.	-.16194	.11073	.328	-.4407	.1168
narrow X content	Scheffe	Long	Exp.	-.03556	.08689	.920	-.2574	.1863
			Inexp.	-.18944	.08044	.076	-.3948	.0159
		Exp.	Long	.03556	.08689	.920	-.1863	.2574
			Inexp.	-.15389	.07343	.126	-.3414	.0336
		Inexp.	Long	.18944	.08044	.076	-.0159	.3948
			Exp.	.15389	.07343	.126	-.0336	.3414

*. The mean difference is significant at the 0.05 level.

Post-hoc tests for the two significant results are presented in Table 4.14. Levene statistics showed that the homogeneity of variances assumption was not met for the duration measure for function words in broad focus, so the results of a Games-Howell test are presented, in addition to the results of a Scheffe test for

content words in narrow focus where the assumption was met. The post-hoc test results show that the duration difference in function words in broad focus mainly derived from the difference between the Long Residence Group and the Experienced Group (p=.009). However, for the difference in content words in narrow focus, no significant difference between each pair was reported.

The following interaction pattern in Figure 4.6 was observed between the three groups on the duration changes between word type and group in broad focus. To test the significance of the following interaction effect, a repeated measures ANOVA was conducted for the broad focus type with three groups as the between subject variable, and word type as the within subject variable.

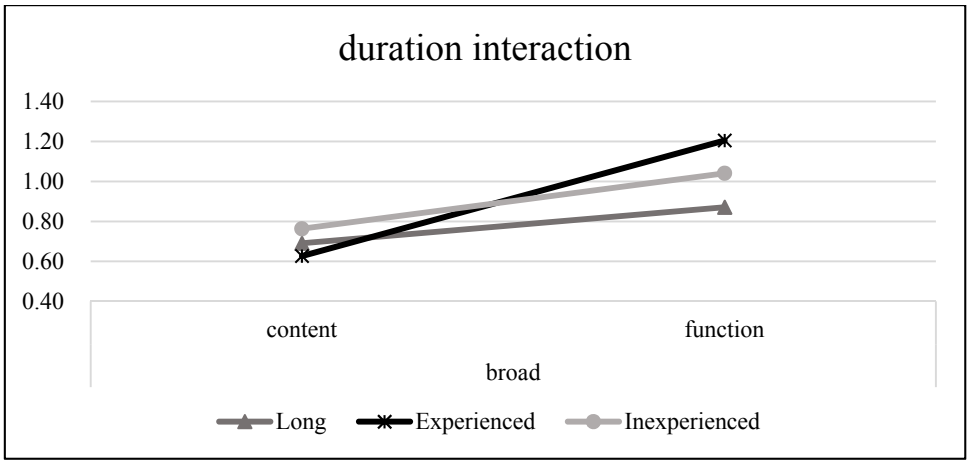

Figure 4.6 Duration Interaction between Word Type and Group in Broad Focus

Table 4.15 shows the repeated measures ANOVA results. The interaction reported above in Figure 4.6 proved to be significant. It is interpreted as indicating that the Experienced Group behaved significantly differently in terms of vowel duration for content and function words in broad focus (F=6.485, p=.004). They resisted producing function words with longer duration in broad focus, which should be accented in the given context, while they performed significantly better at accenting the content word in broad focus. The difference of intensity use as a whole (independently of the group effect) also turned out to be significant (F=13.615, p=.001).

Table 4.15 *Repeated Measures ANOVA Results as a function of Word Type and Length of Residence for Broad Focus*

Source		Type III Sum of Squares	df	F	Sig.
word	duration	2.110	1	54.884	.000
	f0	.001	1	.134	.717
	intensity	.034	1	13.615	.001
word * Group	duration	.499	2	6.485	.004
	f0	.000	2	.008	.992
	intensity	.004	2	.737	.486
Error(word)	duration	1.384	36		
	f0	.379	36		
	intensity	.090	36		

Table 4.16 shows the repeated measures ANOVA results conducted for narrow focus with word type as the within subject variable and group as the between subject variable. The analysis shows that none of the variables for each measure and interaction was statistically meaningful.

Table 4.16 *Repeated Measures ANOVA Results as a function of Word Type and Length of Residence for Narrow Focus*

Source	Measure	Type III Sum of Squares	df	F	Sig.
word	duration	0.033	1	0.773	0.385
	f0	0.104	1	1.173	0.286
	intensity	1.39E-05	1	0.007	0.932
word * Group	duration	0.073	2	0.863	0.43
	f0	0.113	2	0.635	0.536
	intensity	0.002	2	0.401	0.673
Error(word)	duration	1.52	36		
	f0	3.193	36		
	intensity	0.068	36		

4.3.1.4 Transition from Accent to Post-accent

In the observed difference between pre-accent and accent in the previous sections, the most remarkable cue appeared to be vowel duration in focus marking. F0 and

intensity cues were not significant. However, it is known that f0 and intensity cues also change when producing sentence prominence (Cooper et al., 1985). In this section, syntagmatic comparisons were made between accent and post-accent elements, to compensate for the lack of information about the transition from accent to post-accent. The materials included for this examination are content words in narrow focus.

Figures 4.7 to 4.9 show the acoustic changes observed from the accented word to the post-accented word. Overall, the native speaker did not change the duration as much as she did in the pre-accent and accent comparison. Instead, more variations in f0 and intensity were found. The three groups also showed similar patterns. Generally, they adjusted the f0 and intensity of post-accent words more so than the vowel duration.

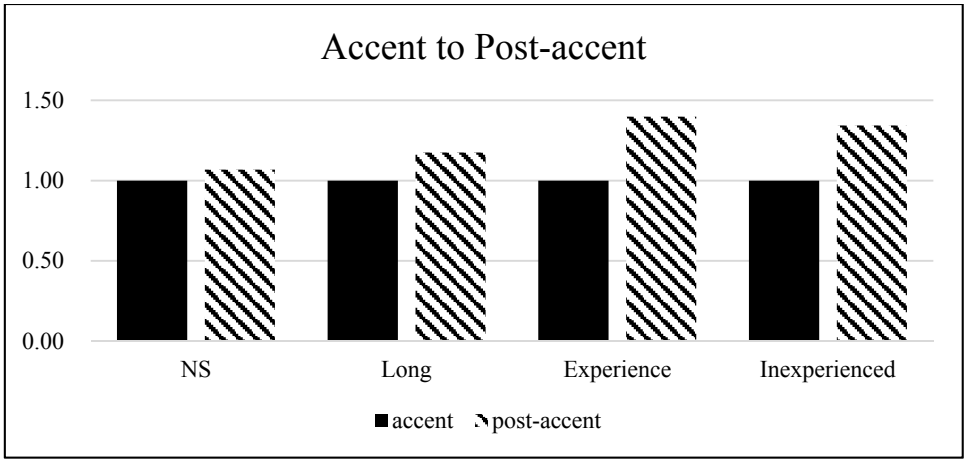

Figure 4.7 Duration Difference between Accent and Post-accent

As shown in Figure 4.7, the native speaker and Long Residence Group showed a post-accent to accent vowel duration ratio of close to or over one, which means that the vowel durations of the post-accent were about the same as or longer than those of the accented words. Also, learners in the Experienced and Inexperienced Groups produced longer vowel durations for the post-accent words than the Long Residence Group and the native speaker.

It seems that this partly corresponds to the results in Kügler (2008). This research examined the durational changes in pre-focus and post-focus words in the given information context pronounced by German speakers (narrow focus in his study). When the same nonsense word was repeated in the pre-focal position, the duration of the word was shortened significantly, but the same word was not shortened in the post-focal position. However, when the data are examined in more detail, it appears that this is not the case for the participants in this study.

Table 4.17 *Means of the Ratios of Measures of Duration, F0, and Intensity for Each Comparison*

	Physics (was my) major			Nuclear physics.		
	Duration	F0	Intensity	Duration	F0	Intensity
Native speaker	1.30	0.69	0.86	0.83	0.87	0.80
Long Residence	1.50	0.72	0.88	0.85	0.85	0.90
Experienced	1.71	0.68	0.96	1.09	0.63	0.95
Inexperienced	1.42	0.68	0.94	1.29	0.92	0.99

As shown in Table 4.17, the duration ratio for each comparison is not consistent, and so the data can't be taken as a whole. When the accented *nuclear* was compared with the unaccented post-word *physics*, the native speaker and the Long Residence Group made the vowel duration about 15% shorter for focus prominence. This 15% change in duration is a bit smaller than those in narrow focus dealt with earlier. Further, in the comparison of *physics-major*, they consistently elongated the stressed vowel of the unaccented post-word.

One possible explanation is that the lengthening of the stressed vowel after the accented word derives from the pre-boundary effect. It is widely known that the phrase- or sentence-final syllable is lengthened (Kaltt, 1976). Although the stressed vowels measured in the present study are in the penultimate syllable of the sentence-final word, the pre-boundary lengthening may also take place. Shattuck-Hufnagel and Turk (1998) report that "pre-boundary lengthening is

greatest in magnitude in the phrase-final syllable, (…) and lengthening extends leftward to the most prominent syllable in the final word" (p. 1236). In addition, for the *physics-major* comparison, the inherent vowel length of the diphthong [eɪ] may also have affected the lengthening of the unaccented vowel as well as the pre-boundary effect.

Figure 4.8 shows the f0 change in the transition from the accented words to post-accented words as a whole. Table 4.17 indicates that there is also a difference in f0 ratios between the two comparisons, but the difference is not as drastic as that observed for duration change. Therefore, f0 difference will be explained as a whole, but some noteworthy points will be made in relation to Table 4.17.

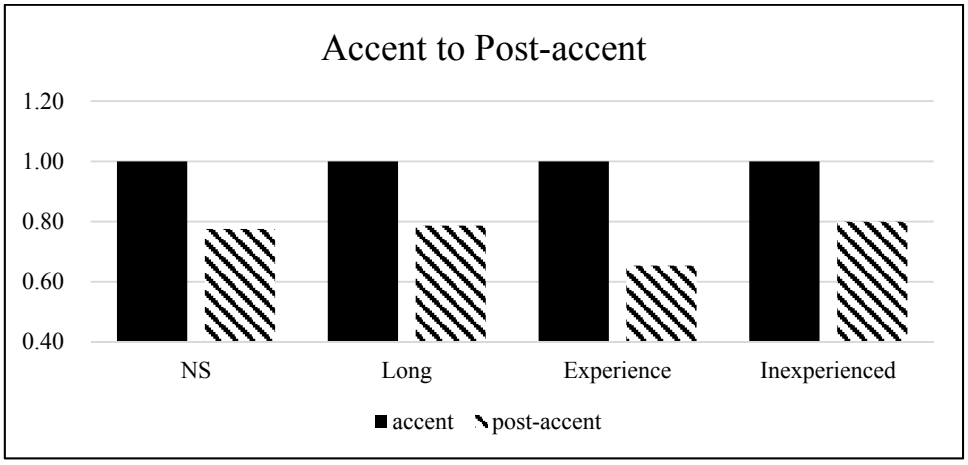

Figure 4.8 F0 Difference between Accent and Post-accent

Figure 4.8 shows changes in f0 in the transition from accent to post- accent. The participants in this study substantially lowered the f0 of the vowel in the post-accent position. In this case, the Experienced Group made the largest changes in pitch range with a decrease of approximately 35%. The other two groups and the native speaker showed changes of approximately 20%.

It was shown that in some cases along the transition from pre-accent to accent, the participants tried to maintain f0, delaying declination. Cooper et al. (1985) showed that in a fixed position within a sentence, declination was delayed by the production of the accent, followed by the significant lowering of f0 in the post-accent word. More specifically, when contrastive focus was realized in the second key word position (among the four key word positions), the pitch was slightly lowered from the pre-focus to focus (about 5Hz), but substantially lowered from the focus to post-focus (25Hz). When the focus was on the third position, the pitch slightly increased from the second non-focused position to the focused position, and decreased by 25Hz from the focus to the post non-focused position, which is sentence final. This finding was observed for contrastive focus, which is narrow focus.

The same pattern was found in the present study. In lowering the vowel pitch of the post-accent words, the Experienced Group showed the largest decrease. This implies that the Experienced Group used relatively more pitch variation to signal

sentence prominence than the other two groups. This peculiar pattern shown by the Experienced Group can also be partly explained by transfer from Korean contrastive focus marking. Jun and Lee (1998) examined f0 variation in Korean contrastive focus, and revealed that Korean speakers change the f0 for perceptual prominence of the focus. More specifically, they state, "what speakers manipulate to enhance prominence of a focused item is the pitch range difference between the focused word and the following word" (p. 1297). This evidence from Korean also lends support to the view that the learners of the Experienced Group are aware of the placement of sentence prominence.

The overreliance on f0 by the Experienced Group mainly came from the comparison of *nuclear-physics*. This tendency was not obvious in the *physics-major* comparison. It seems that for the *physics-major* comparison, the measurement position affected the results. More specifically, the measurements were conducted on the third post-position, not directly after the accented word, to draw a comparison between the content words. However, the f0 of the sentence as a whole decreases as an effect of declination, and thus, it seemed that the f0 variation did not emerge among learners of the Experienced Group in this comparison.

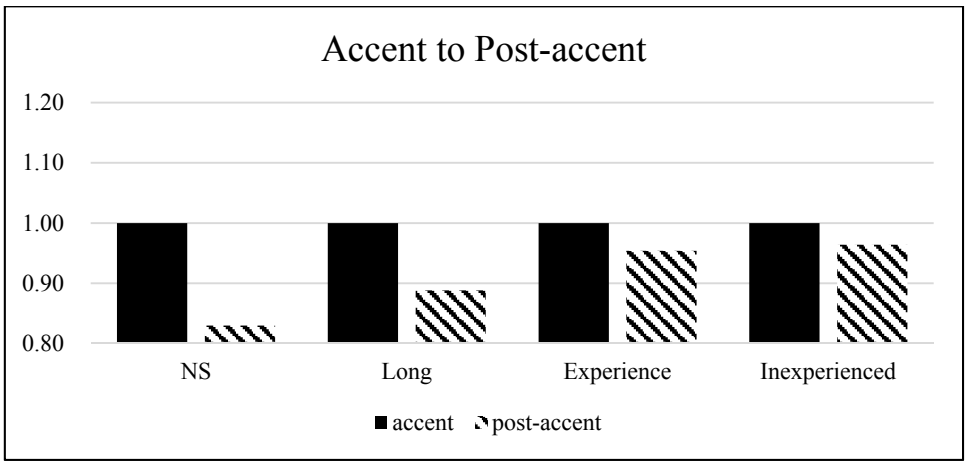

Figure 4.9 Intensity Difference between Accent and Post-accent

Along with f0 changes, more substantial intensity changes (compared to the pre-accent cases) were observed for all three groups, as shown in Figure 4.9. The native speaker and the Long Residence Group made a change in intensity of approximately 10 to 20%. The other two groups also indicated substantial weakening of intensity, although less so than the Long Residence Group and the native speaker.

Table 4.18 shows the descriptive statistics of the accent to post- accent comparison. A one-way ANOVA was conducted for the difference among the three groups. The results in Table 4.19 showed that the intensity difference alone was significant for the three groups (F=4.671, p=.016).

Table 4.18 *Descriptive statistics of the Ratios of Measures of Duration, F0, and Intensity as a Function of Length of Residence*

	duration			f0		Intensity	
	N	*M*	*S.D.*	*M*	*S.D.*	*M*	*S.D.*
Long	9	1.1751	.18171	.7866	.25214	.8882	.08184
Experienced	12	1.3985	.33225	.6535	.21289	.9538	.05518
Inexperienced	18	1.3438	.23905	.7993	.20415	.9641	.05594
Total	39	1.3217	.26768	.7515	.22261	.9434	.06819

Table 4.19 *One-way ANOVA Results of the Group Difference as a Function of Length of Residence*

		Sum of Squares	df	F	Sig.
duration	Between Groups	.273	2	2.005	.149
	Within Groups	2.450	36		
	Total	2.723	38		
f0	Between Groups	.167	2	1.757	.187
	Within Groups	1.716	36		
	Total	1.883	38		
intensity	Between Groups	.036	2	4.671	.016
	Within Groups	.140	36		
	Total	.177	38		

The results of the post-hoc (Scheffe) test in Table 4.20 below show that the main difference was between the Long Residence Group and the Inexperienced Group (p=.019).

Table 4.20 *Post-hoc Comparison Results of the Intensity Ratio by the Three Groups*

Dependent Variable		(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
intensity	Scheffe	Long	Exp.	-.06555	.02753	.072	-.1358	.0047
			Inexp.	-.07587*	.02548	.019	-.1409	-.0108
		Exp.	Long	.06555	.02753	.072	-.0047	.1358
			Inexp.	-.01033	.02326	.906	-.0697	.0491
		Inexp.	Long	.07587*	.02548	.019	.0108	.1409
			Exp.	.01033	.02326	.906	-.0491	.0697

*. The mean difference is significant at the 0.05 level.

4.3.2 Paradigmatic Observation

In paradigmatic observation, the three groups as well as the native speaker did not show much difference in the use of duration, f0, and intensity for the three target words. Table 4.21 shows means and standard deviations of the ratios of each

acoustic measure from the three groups. The results indicate that when the same word was repeated, f0 and intensity of lexically stressed vowels were lowered compared to at first mention. As for the duration ratio, the Experienced Group alone shortened the vowel duration of the repeated words. The Long Residence Group did not change it much, and the Inexperienced Group slightly lengthened it.

Table 4.21 *Descriptive Statistics of the Ratios of Measures of Duration, F0, and Intensity as a Function of Length of Residence*

		Duration		F0		Intensity	
	N	*M*	*S.D*	*M*	*S.D*	*M*	*S.D*
NS	1	1.11130		1.04216		0.96361	
Long	9	1.02501	0.119283	0.93067	0.184172	0.95717	0.027487
Experienced	12	0.95437	0.131373	0.92726	0.109448	0.97558	0.019249
Inexperienced	18	1.10088	0.254209	0.93897	0.073435	0.98267	0.028366
Total	39	1.03829	0.202542	0.93345	0.114234	0.9746	0.027007

Note. There was a missing f0 value for participant 39; pitch was not defined with the same voicing threshold condition (0.45). Hence, only two cases were averaged for the thirty-ninth participant's f0

A one-way ANOVA was conducted for each ratio to examine whether the differences among the groups were significant, but none of the measures were reported as significant, as shown in Table 4.22 below.

Table 4.22 *One-way ANOVA Results of the Group Difference as a Function of Length of Residence*

		Sum of Squares	df	F	Sig.
duration	Between Groups	.157	2	2.011	.149
	Within Groups	1.402	36		
	Total	1.559	38		
F0	Between Groups	.001	2	.039	.962
	Within Groups	.495	36		
	Total	.496	38		
Intensity	Between Groups	.004	2	2.963	.064
	Within Groups	.024	36		
	Total	.028	38		

4.4 Summary and Discussion

In this chapter, experimental results were reported on Korean learners' use of English sentence stress. 39 participants were grouped based on their length of

exposure to English in an ESL context, and they were examined in terms of their use of acoustic cues such as vowel duration, pitch (f0), and intensity for stressed vowels with sentence prominence. The results of the observation imply that they can produce English sentence stress as accurately as native speakers do in the case that they are amply exposed to spoken English. The participants in the Long Residence Group performed the experimental tasks in a similar way to the native speaker. However, the results of the learners who did not have exposure to English in an ESL context showed that it would be difficult to learn sentence stress without any such experience. In what follows, I discuss the details and implications of each finding.

First, it was predicted that Korean learners would have more difficulty in producing broad focus accurately than narrow focus because the accentuation in broad focus needs a more complicated mechanism including a language-specific rule and a judgment concerning given-new information in the ongoing discourse. The results showed that broad focus was more difficult for Korean learners to produce than narrow focus, as predicted. Overall, the participants showed more substantial vowel duration change, which is the primary cue of prominence for accented words, in narrow focus than in broad focus. For narrow focus, the participants exhibited a change of approximately 30% or higher in vowel duration

for pre-accented and accented words, especially those in Experienced and Inexperienced Groups, who learned English most of the time in an EFL context.

However, to be exact, the prediction was half confirmed and half rejected because the Experienced and Inexperienced Groups showed different patterns depending on the word type (content or function words). At first, the prediction was made on the grounds that broad focus needs a more complicated accentuation system than narrow focus. However, this was not the case for the Experienced Group. They performed in a similar way to the Long Residence Group in accenting the content words, showing that they know how and where to place the sentence stress in broad focus when it comes to content words. Actually, the Experienced Group changed vowel duration more than the Long Residence Group for the accentuation on content words in broad focus. This result is not surprising considering the findings in Baker (2010). She showed that Korean learners of English with, on average, a two-year stay in the U.S. were able to predict the correct placement of English sentence stress in a given context as accurately as native speakers. Korean participants in her study were aware of the place of English sentence stress in broad focus when they were given question-answer pairs in a written format and asked to choose the most prominent part in the given answers.

As for the Inexperienced Group, they showed a more consistent pattern regarding the accentuation in broad focus. The acoustic changes indicated that they failed to apply the sentence stress rule to the last lexical item in broad focus, and this failure was observed for both content and function words. In other words, the Inexperienced Group produced the unaccented and accented vowels with almost the same duration for function words. Further, for content words, they manifested less changes in vowel duration than the Experienced and Long Residence Groups. Note, however, that the target vowels of the accented content words in broad focus were diphthongs. Thus, it is possible to suppose that they produced the diphthongs without sentence stress because the inherent vowel duration of diphthongs is longer than that of monophthongs. In addition, they might have produced the target diphthong vowels as a combination of two monophthongs, which naturally results in longer vowel duration of the target vowels. Therefore, it cannot be claimed that the learners of this group are aware of the accentuation of broad focus. Moreover, the acoustic cues they used for function words are taken to lend support to the claim that the learners of the Inexperienced Group are not able to apply the sentence stress placement rule in broad focus. Therefore, they would benefit from instruction of the sentence stress rule.

Second, the results revealed that Korean learners have problems with accentuation of function words in broad focus. The Experienced Group showed

more interesting results concerning function words in broad focus than the other two groups. Despite their accurate performance in sentence stress production for content words, the Experienced Group exhibited radically different behavior for function word accentuation. They made the vowel duration shorter for function words independently of the placement of sentence stress. That is, they lengthened the vowel duration for the accented content words as much as the Long Residence Group did, while they did not lengthen the duration for the accented function words. This pattern shown by the Experienced Group clearly contrasts with that of the Long Residence Group. The Long Residence Group consistently made the vowel duration longer when it was accented regardless of word type. This distinctive pattern resulted in the interaction pattern of the groups and the word type, which is statistically significant. This discrepancy seems to be derived from asymmetrical knowledge of the accentuation of function words. The participants in Experienced Group had some exposure to English in an ESL context, and many of them were majors in English or related fields. Thus, they are knowledgeable about the characteristics of spoken English, and their production was hindered by their knowledge: function words are usually reduced in spoken English. Unfortunately, they are not aware of the possible accentuation of function words at the discourse level. They would benefit from a more clear understanding of function word reduction.

Third, an interesting observation was made concerning the patterns in f0 changes produced by the Korean learners, especially the Experienced Group. The Experienced Group showed a couple of distinctive patterns of f0 changes compared to the other two groups. When broad and narrow focus were compared in general, the other two groups and the native speaker showed a slight decrease in pitch, which is seen as declination, in the transition from pre-accent to accent words. However, the Experienced Group maintained the pitch of the accented vowels in broad focus, thus delaying declination. That is, for Experienced Group, the f0 values of the stressed vowel of pre-accented words and accented words were about the same, with no decrease. They also showed a peculiar pattern for narrow focus. During the transition from pre-accent to accent in narrow focus, they lowered the pitch much more than the other two groups and the native speaker. Also, in the examination of the transition from accent to post-accent, the Experienced Group lowered the vowel pitch much more than the other two groups and the native speaker. One could take this to mean that Korean learners compensate for the lack of durational change by varying vowel pitch more. It can be claimed that the Experienced Group made better use of f0 than duration, which might be easier for Korean learners. This also partly shows that the participants in this group have some knowledge about accentuation but have a problem with the phonetic realization of it.

The overreliance on f0 by the Experienced Group raises a question about the native English listeners' perception of Korean learners' sentence stress. It is not known whether the use of f0 by Korean learners can be perceived as prominent by native listeners in syntagmatic observation, and this should be experimentally tested to be informative in the teaching context.

Fourth, in paradigmatic observation, the participants showed slight changes in f0 and intensity. The differences among the three groups were not significant. As for the duration ratio, only the Experienced Group shortened the vowels on words upon second mention, but the differences among the groups were not significant. The difference observed in paradigmatic observation seems not to be substantial when compared to those in syntagmatic observation. Also, the results are not strong enough to conclude that the changes in f0 and intensity between the vowels upon first and second mention are caused by focus marking.

CHAPTER 5 CONCLUSION

5.1 Findings and Pedagogical Implications

The present study explored the contribution of English sentence stress to perceived comprehensibility of L2 speech, and revealed Korean learners' use of English sentence stress. The findings of the present study can be summarized as follows:

First, sentence stress appropriacy has been proved to be a significant predictor of L2 speech comprehensibility, along with the number of pauses and the articulation rate. The contribution of L2 sentence stress to speech comprehensibility was no less important than speech rate and pause use.

Second, comprehensibility and foreign-accentedness were distinguished in the use of prominence and pause relevance. Foreign-accentedness was best predicted by speech rate factors and prominence frequency, which does not reflect the appropriacy of sentence stress and the information unit. This indirectly asserts that learners need to be taught the placement of sentence stress, without overemphasizing the rhythmic pattern of spoken English.

Third, Korean learners of English learned narrow focus more easily than broad focus. The Inexperienced Group seemed to be not fully informed about sentence level prominence. Furthermore, accentuation in broad focus is especially

problematic for Korean learners when the accentuation occurs on function words. Function words in broad focus exhibited the most complicated pattern in the acoustic correlates produced by the Korean learners. It seemed that knowledge possessed by the Experienced Group concerning function word reduction according to English rhythm hindered them from accenting the words when they needed to be accented at the discourse-level.

Fourth, Korean learners (especially the Experienced Group) marked the accentuation of the target words by varying f0 cues with ease. In some cases, they delayed the declination in the transition from pre-accent to accent, while lowering the pitch from accent to post-accent substantially more than the other two groups and the native speaker.

The findings of this study have pedagogical implications for the 'what' and 'how' of pronunciation teaching in the communicative context. English sentence stress is important for speech comprehension by native listeners, but it has not received much attention in the L2 context. Rather, more focus was given to the speech rate, pause use, and stress timing itself. However, sentence stress as well as speech rate and pauses affects the perceived comprehensibility. Thus, teaching English sentence stress may significantly help learners acquire more comprehensible speech in the EFL context.

Second, Korean learners who have not been in an ESL context have difficulty placing sentence stress, and they are not aware of the importance of sentence stress placement in English production. Teaching English sentence stress may help learners be better understood in the communicative context, especially advanced learners. Also, it may alleviate the awkward rhythm and monotonous pitch variation produced by Korean learners.

Finally, in an EFL context, teaching English sentence stress is not an easy task, because various skills in the English language must be dealt with in a limited amount of time. However, the placement of sentence stress is inherently related to the use of anaphoric and referential expressions. Therefore, instruction on the use of sentence stress needs to be more integrated into approaches to teaching pronunciation, especially regarding English grammar at the discourse level.

5.2 Limitations of the Study and Suggestions for Future Research

The present study provided confirmatory evidence for the importance of English sentence stress in L2 speech comprehensibility. Further, it revealed the difficulties that Korean learners undergo during the production of sentence stress in light of the focus type and word type. Supplementing the following limitations of the study would support further interpretation of the results.

To control the vocabulary and grammar effect, the experiments conducted in this research employed read speech materials. This might have affected the occurrence of pauses and speech rate. Therefore, further research with natural speech samples obtained from extemporaneous speech would allow for more generalizations. Moreover, a larger number of participants would increase the explanatory power.

Also, it is still somewhat unclear whether the Korean learners who showed deviations in the use of acoustic cues are not aware of the correct placement of sentence stress or whether they just have problems with the phonetic realization of sentence stress. A more refined study should address this issue. Furthermore, a perception test by native listeners should be performed on the sentence stress production of Korean learners. Some of the participants made more variation in the f0 to mark the focus, but it should be tested whether native listeners perceive this as prominent or disregard it, to determine its implications for sentence stress teaching.

REFERENCES

Ahn, H. (2008). Yeong-eo bareum-ui jeonghwakseong-gwa yuchangseong gubun-e daehayeo (On the distinction between accuracy and fluency in English pronunciation). *Foreign Language Education Research*, *11*, 84-96.

Baker, R. E. (2010). *The acquisition of English focus marking by non-native speakers*. Unpublished doctoral dissertation, Northwestern University, IL.

Baumann, S. (2006). *The intonation of givenness: Evidence from German*. Tübingen, Germany: Niemeyer.

Birch, S., & Clifton, C. (1995). Focus, accent, and argument structure: Effects on language comprehension. *Language and Speech*, *38*(4), 365-391.

Bock, J. K., & Mazzella, J. R. (1983). Intonational marking of given and new information: Some consequences for comprehension. *Memory & Cognition*, *11*(1), 64-76.

Boersma, P., & Weenink, D. (2014). *Praat: doing phonetics by computer* (version 5.3.82).

Bolinger, D. L. (1958). A theory of pitch accent in English. *Word*, *14*(2-3), 109-149.

Bolinger, D. L. (1972). Accent is predictable (if you're a mind-reader). *Language*, *48*(3), 633-644.

Brazil, D. (1997). *The communicative value of intonation in English*. Cambridge: Cambridge University Press.

Bresnan, J. W. (1971). Sentence stress and syntactic transformations. *Language*, *47*(2), 257-281.

Brown, G. & Yule, G. (1983). *Discourse analysis*. Cambridge: Cambridge University Press.

Celce-Murcia, M., Brinton, D. M., & Goodwin, J. M. (1996). *Teaching pronunciation: A reference for teachers of English to speakers of other languages*. Cambridge: Cambridge University Press.

Celik, M. (2005). Teaching English intonation to EFL/ESL students. In Meenakshi Raman (ed.), *English Language Teaching*. New Dehli: Atlantic Publishers and Distributers.

Chafe, W. (1976). Givenness, contrastiveness, definiteness, subjects, topics and point of view. In C. N. Li (ed.), *Subject and Topic* (pp. 25-55). New York: Academic Press.

Choi, H-W. (1997). Topic and focus in Korean: The information partition by phrase structure and morphology. *Japanese/Korean Linguistics*, 6, 545-561.

Choi, K. M., & Jang, T. Y. (2007, July). An experimental study on focus structures of English utterances by native speakers and Korean learners. Paper presented at *the 2007 KSAA Conference*, Perth, Western Australia.

Chomsky, N., & Halle, M. (1968). *The sound pattern of English*. New York: Harper & Row.

Clark, H. H., & Haviland, S. E. (1977). Comprehension and the given-new contract. In R. Freedle (ed.), *Discourse production and comprehension. discourse processes: Advances in research and theory*, *1* (pp. 1-40). Norwood, NJ: Ablex.

Cooper W. E., Eady, S. J., & Mueller, P. R. (1985). Acoustical aspects of contrastive stress in question-answer context. *The Journal of the Acoustical Society of America*, *77*(6), 2142-2156.

Cutler, A. (1976). Beyond parsing and lexical look-up. In R. J. Wales, &E.C. T. Walkers (eds.), *New approaches to language mechanisms: A collection of psycholinguistic studies* (pp. 133-149). Amsterdam: North-Holland Pub.

Cutler, A. (1984). Stress and accent in language production and understanding. In D. Gibbon, & H. Ritcher (eds.), *Intonation, accent and rhythm: Studies in discourse phonology*, *8* (pp. 76-90). New York: Walter de Gruyter.

Cutler, A., & Fodor, J. A. (1979). Semantic focus and sentence comprehension. *Cognition*, *7*(1), 49-59.

Derwing, T. M., & Munro, M. J. (1997). Accent, intelligibility, and comprehensibility: Evidence from four L1s. *Studies in Second Language Acquisition*, *19*(1), 1-16.

Derwing, T. M., Munro, M. J., & Wiebe, G. (1998). Evidence in favor of a broad framework for pronunciation instruction. *Language Learning*, *48*(3), 393-410.

Deterding, D. (2001). The measurement of rhythm: A comparison of Singapore and British English. *Journal of Phonetics*, *29*(2), 217-230.

Eady, S. J., & Cooper, W. E. (1986). Speech intonation and focus location in matched statements and questions. *The Journal of the Acoustical Society of America*, *80*(2), 402-415.

Field, J. (2009). *Listening in the language classroom*. Cambridge: Cambridge University Press.

Flege, J. E., Munro, M. J., & MacKay, I. R. (1995). Factors affecting strength of perceived foreign accent in a second language. *The Journal of the Acoustical Society of America*, *97*(5), 3125-3134.

Fowler, C. A., & Housum, J. (1987). Talkers' signaling of “new” and “old” words in speech and listeners' perception and use of the distinction. *Journal of Memory and Language*, *26*(5), 489-504.

Fuchs, A. (1984). Deaccenting and default accent. In D. Gibbon, & H. Ritcher (eds.), *Intonation, accent and rhythm: Studies in discourse phonology*, *8* (pp. 134-164). New York: Walter de Gruyter.

Grice, H. P. (1975). Logic and conversation. In P. Cole & J. L. Morgan (eds.), *Syntax and semantics, Vol. III: Speech acts* (pp. 41-58). New York: Academic Press.

Gundel, J., Hedberg, N., & Zacharski, R. (1993). Cognitive status and the form of referring expressions in discourse. *Language*, *69*, 274-307.

Gussenhoven, C. (1983). Focus, mode and the nucleus. *Journal of Linguistics*, *19*(2), 377-417.

Hahn, L. D. (2004). Primary stress and intelligibility: Research to motivate the teaching of suprasegmentals. *TESOL Quarterly*, *38*(2), 201-223.

Hahn, L. D., & Dickerson, W. B. (1999). *Speech craft: Discourse pronunciation for advanced learners*. Ann Arbor: The University of Michigan Press.

Halliday, M. A. K. (1967). Notes on transitivity and theme in English: Part 2. *Journal of Linguistics*, *3*(2), 199-244.

Halliday, M. A. K., & Greaves, W. S. (2008). *Intonation in the grammar of English*. London: Equinox Pub.

Halliday, M. A. K., & Hasan, R. (1976). *Cohesion in English*. New York: Longman.

Heusinger, K. v. (1999). *Intonation and information structure*. Unpublished doctoral dissertation, University of Konstanz, Germany.

Hirschberg, J. (2004). Pragmatics and intonation. In L. R. Horn, & G. L. Ward (eds.), *The handbook of pragmatics* (pp. 515-537). Malden, MA: Blackwell Pub.

Isaacs, T., & Trofimovich, P. (2012). Deconstructing comprehensibility. *Studies in Second Language Acquisition*, *34*(3), 475-505.

Jackson, K. H. (2008). *The effect of information structure on Korean scrambling*. Unpublished doctoral dissertation, University of Hawaii, HI.

Jenkins, J. (2002). A sociolinguistically based, empirically researched pronunciation syllabus for English as an international language. *Applied Linguistics*, *23*(1), 83-103.

Jun, S. A. (1996). *The phonetics and phonology of Korean prosody*. New York: Garland Publishing.

Jun, S. A., & Lee, H. J. (1998). Phonetic and phonological markers of contrastive focus in Korean. *Proceedings of the 5th International Conference on Spoken Language Processing*, *4* (pp. 1295–1298). Sydney, Australia.

Jun, Y. (2013). *Hangugeo myeongsagu-ui uimiron: hanjeongseong/teukjingseong, chongchingseong, boksuseong* (*A semantics for Korean noun phrases:*

definiteness/specificity, genericity, plurality). Seoul: Seoul National University Press.

Kang, H. S. (1996). Acoustic and intonational correlates of the informational status of referring expressions in Seoul Korean. *Language and Speech*, *39*(4), 307-340.

Kang, O. (2010). Relative salience of suprasegmental features on judgments of L2 comprehensibility and accentedness. *System*, *38*(2), 301-315.

Kang, O., Rubin, D. O. N., & Pickering, L. (2010). Suprasegmental measures of accentedness and judgments of language learner proficiency in oral English. *The Modern Language Journal*, *94*(4), 554-566.

Kang, S., Guion-Anderson, S., Rhee, S.-C., & Ahn, H. (2012). The effect of language immersion on the acquisition of second language suprasegmentals. *Korean Journal of Applied Linguistics*, *28*(1), 179-207.

Kim, H. (1998). Yeongeo jeongboyuhyeong-ui eogyang: Hangugin yeongeo hakseupja-reul jungsimeuro (The intonation of English information types: A study of Korean English learners). *The Journal of English Language and Teaching*, *9*, 165-187.

Kim, K. (2004). Yeongeo chojeom gumun-e natananeun chojeom balhwa-ui eumhyangjeok teukseong bigyo yeongu: Migugin hwaja-wa hangugin hwaja-reul jungsimeuro (A comparative study between English and

Korean speakers on the acoustic characteristics of focus realization in English focus sentences). *Speech Sciences*, *11*(2), 89-104.

Kim, O.-Y. (2007). An acoustic study of English sentence stress and rhythm produced by Korean speakers. *Speech Sciences*, *14*(1), 121-135.

Klatt, D. H. (1976). Linguistic uses of segmental duration in English: Acoustic and perceptual evidence. *The Journal of Acoustical Society of America*, *59*(5), 1208-1221.

Kreidler, C. W. (2004). *The pronunciation of English: a course book* (2nd ed.). Malden, MA: Blackwell Pub.

Kügler, F. (2008, May). The role of duration as a phonetic correlate of focus. *Proceedings of the Speech Prosody 2008 Conference* (pp. 591-594). Campinas, Brazil.

Ladd, D. R. (1979). Light and shadow: a study of the syntax and semantics of sentence accent in English. In L. R. Waugh & F. van Coetsem (eds.), *Contributions to grammatical studies: Semantics and syntax*, *2* (pp. 93-131). Baltimore, MD: University Park Press.

Ladd, D. R. (1996). *Intonational phonology*. Cambridge: Cambridge University Press.

Ladefoged, P. (2001). *A course in phonetics* (4th ed.). Orlando, FL: Harcourt.

Lambrecht, K. (1994). *Information structure and sentence form: Topic, focus, and the mental representations of discourse referents* (Vol. 71). Cambridge: Cambridge University Press.

Lee, Y. C., & Xu, Y. (2010). Phonetic realization of contrastive focus in Korean. *Proceedings of Speech Prosody 2010*. Chicago.

Newman, S. S. (1946). On the stress system of English, *Word*, *2*, 171-187.

Mo, Y. (2010). *Prosody production and perception with conversational speech*. Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign, IL.

Munro, M. J., & Derwing, T. M. (1994). Evaluations of foreign accent in extemporaneous and read material. *Language Testing*, *11*(3), 253-266.

Munro, M. J., & Derwing, T. M. (1995a). Foreign accent, comprehensibility, and intelligibility in the speech of second language learners. *Language Learning*, *45*(1), 73-97.

Munro, M. J., & Derwing, T. M. (1995b). Processing time, accent, and comprehensibility in the perception of native and foreign-accented speech. *Language and Speech*, *38*(3), 289-306.

Munro, M. J., & Derwing, T. M. (1998). The effects of speaking rate on listener evaluations of native and foreign-accented speech. *Language Learning*, *48*(2), 159-182.

Munro, M. J., & Derwing, T. M. (1999). Foreign accent, comprehensibility, and intelligibility in the speech of second language learners. *Language Learning*, *49*(Supp. 1), 285-310.

Munro, M. J., & Derwing, T. M. (2001). Modeling perceptions of the accentedness and comprehensibility of L2 speech the role of speaking rate. *Studies in Second Language Acquisition*, *23*(4), 451-468.

Munro, M. J., Derwing, T. M., & Holtby, A. K. (2012). Evaluating individual variability in foreign accent comprehension. In. J. Levis & K. LeVelle (eds.). *Proceedings of the 3rd Pronunciation in Second Language Learning and Teaching Conference*, Sept. 2011 (pp. 233-239). Ames, IA: Iowa State University.

O'brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity*, *41*(5), 673-690.

Park, M., & Son, S. (2012). A study of learning/teaching English intonation in middle school and high school: survey-based. *Modern Studies in English Language & Literature*, *56*(1), 337-356.

Park, M., & Son, S. (2013). A study of English intonation in Korean middle and high schools: Focusing on school textbooks. *The Journal of Studies in Language*, *29*(3), 443-462.

Pierrehumbert, J. B. (1980). *The phonology and phonetics of English intonation*. Unpublished doctoral dissertation, Massachusetts Institute of Technology, MA.

Ross, J. R. (1986). *Infinite syntax*. Norwood, NJ: Ablex Publishing Corporation.

Prince, E. F. (1981). Toward a taxonomy of given-new information. In P. Cole (ed.), *Radical pragmatics* (pp. 223-325). New York: Academic Press.

Prince, E. F. (1992). The ZPG letter: Subjects, definiteness, and information-status. In S. A. Thompson & W. C. Mann (eds.), *Discourse description: Diverse analyses of a fund raising text* (pp. 295-325). Amsterdam: John Benjamins.

Saito, K. (2011). Identifying problematic segmental features to acquire comprehensible pronunciation in EFL settings: The case of Japanese learners of English. *RELC Journal*, *42*(3), 363-378.

Saito, K., Trofimovich, P., & Isaacs, T. (2015). Second language speech production: Investigating linguistic correlates of comprehensibility and accentedness for learners at different ability levels. *Applied Psycholinguistics*, *36*, 1-24.

Schmerling, S. F. (2013). *Aspects of English sentence stress*. Austin, TX: University of Texas Press.

Selkirk, E. (1995). Sentence prosody: Intonation, stress, and phrasing. In J. A. Goldsmith (ed.), *The Handbook of phonological theory* (pp. 550-569). Cambridge, MA: Blackwell Pub.

Shattuck-Hufnagel, S., & Turk, A. (1998). The domain of phrase-final lengthening in English. *Proceedings of the 16th International Congress on Acoustics* (pp. 1235-1236). Seattle, USA.

Silverman, K., Beckman, M., Pitrelli, J., Ostendorf, M., Wightman, C., Price, P., Pierrehumbert J., & Hirschberg, J. (1992). TOBI: a standard for labeling English prosody. In *The Second International Conference on Spoken Language Processing, ICSLP 1992,* Banff, Alberta, Canada.

Sohn (1999). *The Korean Language*. Cambridge: Cambridge University Press.

Sridhar, V. K. R., Nenkova, A., Narayanan, S., & Jurafsky, D. (2008, May). Detecting prominence in conversational speech: pitch accent, givenness and focus. In *Proceedings of Speech Prosody* (Vol. 453, p. 456). Campinos,, Brazil: International Speech Communication Association.

Taniguchi, M. (2001). Japanese EFL learners' weak points in English intonation. In *Phonetics Teaching and Learning Conference*. London.

Taniguchi, M., & Shibata, Y. (2007). Japanese learners' English intonation: Discrepancy between intonation intended and intonation performed. In *Procedings of 16th International Congress of Phonetic Science* (pp. 1689-1692). Saarbrücken, Germany.

Terken, J., & Nooteboom, S. G. (1987). Opposite effects of accentuation and deaccentuation on verification latencies for given and new information. *Language and Cognitive Processes*, *2*(3-4), 145-163.

Trofimovich, P., & Baker, W. (2006). Learning second language suprasegmentals: Effect of L2 experience on prosody and fluency characteristics of L2 speech. *Studies in Second Language Acquisition*, *28*(1), 1-30.

Trofimovich, P., & Baker, W. (2007). Learning prosody and fluency characteristics of second language speech: The effect of experience on child learners' acquisition of five suprasegmentals. *Applied Psycholinguistics*, *28*(02), 251-276.

Trofimovich, P., & Isaacs, T. (2012). Disentangling accent from comprehensibility. *Bilingualism: Language and Cognition*, *15*(4), 905-916.

Turk, A. E., & Sawusch, J. R. (1996). The processing of duration and intensity cues to prominence. *The Journal of the Acoustical Society of America*, *99*(6), 3782-3790.

Um, H., Lee, H., & Kim, K. (2001). Chojeom-gwa jeongbo gujo-e ttareun hangugeo hwaja-ui yeongeo eogyang silhyeon yangsang (Korean speakers' realization of focus and information structure on English intonation in comparison with English native speakers). *Speech Sciences*, *8*(2), 133-148.

Urdan, T. C. (2005). *Statistics in plain English*. Mahwah, NJ: Lawrence Erlbaum Associates.

Van Son, R. J. J. H., Koopmans-van Beinum, F. J., & Pols, L. C. (1998). Efficiency as an organizing principle of natural speech. In *International Conference on Spoken Language Processing*. Sydney, Australia.

Vanderplank, R. (1993). 'Pacing' and 'spacing' as predictors of difficulty in speaking and understanding English. *ELT Journal*, *47*(2), 117-125.

Wells, J. C. (2006). *English Intonation: An Introduction*. Cambridge: Cambridge University Press.

Wennerstrom, A. (1994). Intonational meaning in English discourse: A study of non-native speakers. *Applied Linguistics*, *15*(4), 399-420.

Wennerstrom, A. (1998). Intonation as cohesion in academic discourse. *Studies in Second Language Acquisition*, *20*(1), 1-25.

Wieman, L. A. (1976). Stress patterns of early child language. *Journal of Child Language*, *3*, 283-286.

Yang, B. (2003). *Peurateu-reul iyonghan eumseongbunseog-ui iron-gwa silje* (*Theory and Practice of Speech Analysis Using Praat*). Busan: Mansu Pub.

APPENDICES

1. Appendix A Recording Materials for Experiment 1
2. Appendix B Rating Criteria for Comprehensibility and Foreign-Accentedness
3. Appendix C Ratings and Measurement Results as a Function of Length of Residence
4. Appendix D Recording Materials for Experiment 2

Appendix A

Recording Materials for Experiment 1 (Kreidler, 2004, pp. 149 - 151)

(Places of sentence stress are underlined)

Female: / Have you taken your family to the zoo yet, / John? /

Male: No, but my kids have been asking me to. I've heard this city has a pretty big one.

Female: / Yes, / it doesn't have a lot of animals,[29]/ but it has quite a variety of animals./ I think your kids[30] / would enjoy seeing the pandas./

Male: I'm sure they would. I'd like to see them, too.

Female: /Also,/ the tigers are worth looking at./

Male: Is it okay to feed them?

Female: /No, / they're not used to being fed./

Male: What bus do you take to get there?

Female: / Number Twenty-eight./ But don't you have a car?/

Male: We used to have one, but we had to sell it.

[29] In this sentence with contrastive focus, the sentence stress may be placed on *animals*. If the speaker has planned the speech as a whole before the utterance, contrastive focus will be realized on *lot*. If it is not, the first clause can have the default sentence stress on *animals* (Wells, 2006).

[30] Kreidler (2004) notes that *think* may receive sentence stress rather than *kids*, since *kids* is given information in the context.

Appendix B

The rating criteria for comprehensibility and foreign-accentedness[31]

Instructions

In this experiment, you are asked to judge the degree of Foreign-accentedness and Comprehensibility of the ***female speaker***s' pronunciation to whom you listen. The definitions of the terms used in the ratings are as follows:

Comprehensibility: How easy or difficult you can comprehend the speech. (A listeners' perception of the degree of difficulty in understanding an utterance, Munro, Derwing, Holtby, 2012). If there is no problem understanding the speech, you will circle the number '7'. If the comprehension is severely hindered, circle the number '1'.

- ✓ Incomprehensible speech means that the speaker to whom you listened to was hard to understand / required a lot of effort to understand / made it difficult to grasp the meaning / was unclear *in the given context.*
- ✓ If her speech was clear / easy to understand / required little effort to understand / made it simple to grasp the meaning just like native North American speakers of English, she is highly comprehensible, and you will circle the number 7.

(bad) 1 2 3 4 5 6 7 (good)

Foreign-accentedness: How much the learner's pronunciation differs from that of native speakers. If it does not differ from the native speakers' at all, circle the number '7'. If it severely deviates from the native norm, circle the number '1'.

- ✓ Deviating from native norm means that the speaker speaks with a foreign accent / has a strong accent / speaks with no English manner of pronunciation / speaks like a non-native speaker of English.
- ✓ If the speaker speaks just like the native North American speakers, she does not have a foreign accent, and you will circle the number 7.

(bad) 1 2 3 4 5 6 7 (good)

[31] The description of comprehensibility and foreign-accentedness followed Kang (2010).

Appendix C

Means and Standard Deviations for Each Variable According to the Three Groups

Descriptives									
						95% Confidence Interval for Mean			
		N	Mean	S.D	Std. Error	Lower Bound	Upper Bound	Min.	Max.
Comprehen-sibility	Long	8	6.4625	.32043	.11329	6.1946	6.7304	5.80	6.80
	Exp.	10	5.4800	.70679	.22351	4.9744	5.9856	4.60	6.60
	Inexp.	17	4.5706	1.07690	.26119	4.0169	5.1243	2.60	6.20
	Total	35	5.2629	1.13632	.19207	4.8725	5.6532	2.60	6.80
Foreign-Accentedness	Long	8	6.1250	.63640	.22500	5.5930	6.6570	5.00	6.90
	Exp.	10	4.9300	.81384	.25736	4.3478	5.5122	3.80	6.20
	Inexp.	17	3.8118	.98163	.23808	3.3071	4.3165	2.40	5.50
	Total	35	4.6600	1.26426	.21370	4.2257	5.0943	2.40	6.90
SS Appropriacy Ratio	Long	8	.2885	.11447	.04047	.1928	.3842	.15	.38
	Exp.	10	.2769	.18561	.05869	.1441	.4097	.08	.69
	Inexp.	17	.2036	.11836	.02871	.1428	.2645	.00	.38
	Total	35	.2440	.14145	.02391	.1954	.2925	.00	.69
Space	Long	8	.0766	.03309	.01170	.0489	.1043	.03	.13
	Exp.	10	.0737	.04342	.01373	.0426	.1047	.02	.16
	Inexp.	17	.0549	.03231	.00784	.0383	.0715	.02	.11
	Total	35	.0652	.03633	.00614	.0528	.0777	.02	.16
Pitch Range	Long	8	174.3750	41.70967	14.74659	139.5048	209.2452	114.00	232.00
	Exp.	10	166.0000	30.21405	9.55452	144.3862	187.6138	107.00	224.00
	Inexp.	17	152.8824	39.52512	9.58625	132.5604	173.2043	90.00	203.00
	Total	35	161.5429	37.64411	6.36302	148.6117	174.4741	90.00	232.00
N of Pauses	Long	8	1.0000	1.19523	.42258	.0008	1.9992	.00	3.00
	Exp.	10	4.3000	2.26323	.71570	2.6810	5.9190	1.00	9.00
	Inexp.	17	4.7647	3.15296	.76471	3.1436	6.3858	.00	11.00
	Total	35	3.7714	2.95143	.49888	2.7576	4.7853	.00	11.00
Total Duration of	Long	8	2.9576	.64593	.22837	2.4176	3.4976	1.85	4.05
	Exp.	10	3.8201	1.23733	.39128	2.9350	4.7053	2.26	5.62

Pauses	Inexp.	17	4.3091	2.03303	.49308	3.2638	5.3544	1.54	8.08
	Total	35	3.8605	1.65201	.27924	3.2930	4.4280	1.54	8.08
Mean Length of Run	Long	8	10.2073	1.96921	.69622	8.5610	11.8536	8.10	13.00
	Exp.	10	6.8115	1.27776	.40406	5.8975	7.7256	4.47	8.56
	Inexp.	17	6.5631	2.33608	.56658	5.3620	7.7642	3.68	11.00
	Total	35	7.4670	2.46991	.41749	6.6186	8.3155	3.68	13.00
Articulation Rate	Long	8	340.4788	37.97035	13.42454	308.7348	372.2228	288.09	389.52
	Exp.	10	313.0349	19.98626	6.32021	298.7376	327.3323	281.75	341.09
	Inexp.	17	284.0126	29.10784	7.05969	269.0467	298.9785	220.71	333.38
	Total	35	305.2113	36.55999	6.17977	292.6525	317.7701	220.71	389.52

Appendix D

Recording Materials for Experiment 2 (Hahn & Dickerson, 1999)

For syntagmatic comparison

1. Broad focus (Focus domain is underlined, accent position italicized, and pre-/post-accent position parenthesized)

1) For next week's project, you'll need the computer. If you've (never) *used* the computer, you'll have to attend a special seminar.

   ; Sentence stress is on "used" (content word).

2) Female: I'm looking for a textbook on physiology. I found (some) *new* textbooks, but do you have any used ones?

   Male: I don't think so. We've already sold the used ones.

   ; Sentence stress is on "new" (content word).

3) Male: The committee just made their promotion-decisions.

   Female: How do you know? Are (you) *on* it?

   Male: No, but I hear about it from someone who is.

   ; Sentence stress is on "on" (function word).[32]

[32] Wells (2006) notes that prepositions can sometimes be accented in broad focus, especially for "*be* + preposition"; he only cited examples involving *wh*-questions (e.g., "Look at this button. What's it for?"), wherein the preposition *for* is accented. However, based on the information of Hahn and Dickerson (1999), the present researcher has determined that the phrases in 3) and 4) have broad focus.

4) Female: That new computer lab is so nice! Have you (been) *in* it?

Male: Not yet!

; Sentence stress is on "in" (function word).

2. Narrow focus (Focus domain is underlined, accent position italicized, and pre-/post-accent position parenthesized)

1) Female: I'm looking for a textbook on physiology. I found some new textbooks, but do you have (any) *used* ones?

Male: I don't think so. We've already sold the used ones.

; Sentence stress is on "used" (content word).

2) Male: Do you have any ideas for your next project?

Female: I (have)[33] a *few* ideas. But nothing very interesting.

; Sentence stress is on "few" (content word).

3) Male: So, when we want to find the stress of a word, we should find the key syllable, then determine the rule?

Female: No. You find the key (syllable) *after* you determine the rule.

; Sentence stress is on "after" (function word).

[33] Technically, the pre-accent word in 2) is the indefinite article *a*; however, measurements for pre-accent comparison were performed based on the nearest content word (i.e., *have*), since the article *a* in this context is barely stressed.

4) Male: Where are the beakers? I looked in the desk.

Female: (Look) *above* the desk. In the cabinet.

; Sentence stress is on "above" (function word).

For accent to post-accent transition

(Focus domain is underlined, accent position italicized, and pre-/post-accent position parenthesized)

Male: What was your major when you were in college?

Female: *Physics* was my (major).[34] ; Sentence stress is on "physics."

Male: What was your area of specialty?

Female: *Nuclear* (physics).[35] ; Sentence stress is on "nuclear."

For paradigmatic comparison

(Target words are underlined)

1. For next week's project, you'll need the computer. If you've never used the computer, you'll have to attend a special seminar.

2. Today's topic is carbohydrates. We'll start with the molecular structure of carbohydrates.

[34] Post-accent measurement was performed on the word *major* for the same reason stated in footnote no. 33.

[35] *Nuclear physics* can also be a compound noun, with primary stress on the first word.

3. The Italian Renaissance began in the late thirteenth century, and it did not end until the fifteenth century. Florence was the center of the Renaissance.

국 문 초 록

적절한 문장 강세의 사용은 영어 모국어 청자들의 발화 이해를 용이하게 해주는 것으로 알려져 있다. 본 연구는 한국인 영어 학습자들의 문장 강세 사용이 원어민들이 인식한 발화의 이해도에 유의미하게 영향을 주는 요소라는 것을 확인하고, 한국인 학습자들의 발화상에 나타난 영어 문장 강세 사용 양상을 관찰하여 문장 강세 교육에서 초점을 두어야 하는 부분을 탐색하고자 하였다.

첫 번째 실험에서는 한국인 학습자의 발화에 대한 원어민 이해도(원어민 청자들이 인식한 발화의 이해 용이도)에 '문장 강세 적절성'이 유의미한 기여를 하는지를 확인하고자 하였다. 이를 위해 먼저 39 명의 한국인 대학생에게 영어대화문을 읽도록 하여 녹음하였다. 다음으로 10 명의 원어민 청자들이 앞서 녹음한 각 발화를 듣고 '이해도(comprehensibility)'와 '외국인 말투 정도(foreign-accentedness)'를 7 점 척도로 평가하였다. 또한 각 발화에 대해 1) 문장강세 적절성, 2) 문장 강세 빈도, 3) 발화 고저 범위, 4) 휴지 빈도, 5) 총 휴지 길이, 6) 평균 발화 길이, 7) 조음 속도를 측정한 뒤, 다중회귀분석의 단계적 선택법을 이용하여 '이해도'와 '외국인 말투 정도'를 예측하는 변인을 선별하였다.

분석 결과, '이해도' 점수는 '휴지 빈도', '문장 강세 적절성', '조음 속도'를 예측 변인으로 삼았을 때 모형적합도와 설명력이 가장 우수했고, '외국인 말투' 점수는 '평균 발화 길이', '문장 강세 빈도', '조음 속도'가 유의미한 예측인자인 것으로 드러났다. 특히 '문장 강세 적절성'이 '휴지 빈도'나 '조음 속도'와 비교해 '이해도' 점수에 대한 기여도가 적지 않음이 드러났다. 이러한 결과는 의사소통적 교수법에서 영어 문장 강세를 더 중요하게 다룰 필요가 있다는 것을 시사한다.

두 번째 실험에서는 문장 강세에 대한 교수-학습을 효과적으로 시행하기 위한 방안을 탐색하기 위해 한국인 학습자들의 문장 강세 발화 양상과 그 특징을 관찰하였다. 분석을 위해 39 명의 참여자들을 영어권 거주 기간에 따라 준원어민(8~19 년), 상위 수준 학습자(1 개월 반~2 년), 하위 수준 학습자(경험 없음)의 세 집단으로 분류하였다. 한국인 참여자들이 발화한 10 개의 문장 강세를 초점 유형('광의 초점'과 '협의 초점')과 단어 유형('내용어'와 '기능어')로 나누어 문장 강세 음절 모음과 문장 강세 앞 단어 혹은 뒤의 단어의 강세 모음의 길이, 고저, 세기를 측정하여 각 음향 신호의 변화를 관찰하였다. 또한 3 개의 문장 강세 단어에 대해, 동일 단어가 문장 강세 없이 반복되는 경우(즉, 구정보가 되는 경우)에도 각 음향 신호의 변화가 있는지를 살펴보았다.

실험 결과, 영어권 국가에서 상당한 기간 동안 영어를 학습한 한국인 준원어민 집단의 경우 원어민 참여자의 발화와 크게 다르지 않았으나, 영어를 주로 외국어로서 학습한 상위 수준 학습자와 하위 수준 학습자의 경우 다음과 같은 특징을 보여주었다.

첫째, 상위 수준 학습자와 하위 수준 학습자들은 모두 협의 초점 발화는 상대적으로 잘 발음했으나 광의 초점 발화에서는 어려움을 겪는 것으로 나타났다. 상위 수준 학습자들의 경우 이러한 특징이 특히 기능어가 광의 초점 내에서 문장 강세를 가질 때 두드러지는 것으로 확인되었다. 이들은 기능어가 주로 약화된다는 사실을 알고 있고, 이에 따라 문장 강세의 유무에 상관없이 약화를 시키는 경향을 보였다. 반면, 하위 학습자들의 경우 내용어와 기능어에 상관없이 광의 초점에서 문장 강세를 잘 발화하지 못하였다.

둘째, 상위 수준 학습자들은 준원어민 집단과 원어민 화자, 그리고 하위 수준 학습자보다 모음 고저를 과도하게 변화시키는 경향을 보였다. 한국인들의 경우 모음 길이를 변화시키는 데 어려움을 느끼는 탓에 그보다 상대적으로 쉬운 모음 고저의 변화를 통해 문장 강세를 발음하려 하는 것으로 해석되었다.

하위 수준 학습자에게서는 모음 고저에 대한 의존은 관찰되지 않았다. 모음의 고저에 대한 관찰을 이들의 모음 길이 사용과 연관시켜 볼 때, 하위 수준 학습자들의 경우 문장 강세 부여 규칙 자체에 대한 지식이 부재한 것으로 보이고, 상위 수준 학습자의 경우 문장 강세의 음성 실현에 문제가 있는 것으로 해석될 수 있었다. 이는 또한 외국어로서의 영어 환경에서만 영어를 학습하는 경우 문장 강세를 습득하는 것이 매우 어렵다는 것을 나타내기도 한다.

영어의 문장 강세가 영어 원어민 청자들의 발화 이해에 직접적으로 영향을 준다는 점은 오래 전부터 실험적으로 증명되어 왔지만 외국어 교육에서는 제한된 시간과 언어 입력 그리고 문장 강세의 다소 복합한 실현 기제 탓에 그 동안 교육현장에서 우선적으로 다루어 지지 않았던 것으로 보인다. 본 연구는 의사소통 맥락에서 영어권 청자가 비영어권 화자의 발화를 이해할 때 문장 강세가 중요한 역할을 함을 확증하였으며 이를 통해 외국어로서의 영어 화자에 대한 영어 교육에서 문장 강세 교육이 중요함을 강조하였다. 또한 본 연구는 한국인 학습자들이 영어 문장 강세 사용에서 주로 어려움을 겪는 부분이 어디인지를 확인하였고, 이를 바탕으로 효율적이면서도 효과적인 문장 강세의 교수 및 사용을 위해 이들이 어려움을 겪는 부분에 초점을 둔 교육적 처치가 이루어져야 함을 주장하였다. 즉, 한국인 학습자들을 위해서는 그들이 광의 초점에 적용되는 규칙을 정확히 파악하고, 기능어가 담화수준의 맥락에 따라서는 문장 강세를 지닐 수도 있음을 인식할 수 있도록 지도가 이루어질 필요가 있다. 끝으로, 이러한 문장 강세의 사용은 본질적으로 대명사 및 지시표현의 사용과 밀접한 연관이 있으므로 담화 수준의 문법과 결합하여 지도가 이루어지는 것이 효과적일 것으로 판단된다.

핵심어: 영어 문장 강세, 외국어로서의 영어 발음, 이해도, 외국인 말투
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